DEPENDENT AMERICA

By William C. Redfield

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that more than one hundred substances necessary for national defense must be imported from other countries?

that half a million animals are killed every day throughout the world to supply us with leather?

that we import each year a million miles of sausage-casings and twenty-five million toothbrushes.

that we produce no tin and yet we are the largest maker of tinplate and consume more than one half the tin output of the world?

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DEPENDENT AMERICA

DEPENDENT AMERICA

A STUDY OF THE ECONOMIC BASES OF OUR INTERNATIONAL RELATIONS

BY
WILLIAM C. REDFIELD

BOSTON AND NEW YORK
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PREFACE

For many years in following public discussions on economic subjects I have noticed that some factors which are essential to understanding between ourselves and other nations are rarely mentioned and seem not to be comprehended. Writers and speakers on all sides of the debates on world affairs either touch in a casual way upon the living relations between our citizens and those of other countries or do not touch upon them at all. Much is said and written respecting international accord from an ethical, political, or humanitarian viewpoint, but the intimate daily contacts between all our people and those who live outside our borders are ignored.

It is arguable that democracies cannot manage foreign affairs wisely through inability to command continuously the expert knowledge required. Whether or not this is true, certainly no policies can be sound that are based on ignorance of major facts. There are few signs visible among us that some of these facts are known, or that, if known, they are appreciated. No statement of the actual situation is made by our official representatives. We are warned, indeed, that some essential ma-

terials are under alien control, but one would never guess from what is said that every American home and every American life depends daily upon the continuous labor of masses of our fellow men in other lands for indispensable supplies that we cannot produce. We speak casually, almost jauntily, of our 'separate' interests when in fact we are not separate, but are bound to mankind with ties that we cannot break and which we would not dare to sever if we could.

The vital fact in our situation as respects other countries is not geographical distance or political difference, but an intimately related life. In the final analysis it is not so much a matter of the large fields covered by such words as politics, diplomacy, and finance as it is one of hats and shoes and games and many common things. It is not a matter of occasional interest, but one of daily necessity.

No attempt has been made in the following chapters to treat the various subjects exhaustively, for that would require a separate volume on each of many great industries. The purpose has been rather to give a general picture and to suggest sources for further inquiry to those who desire to make it. With this in mind many figures are stated in round numbers and within the facts in order to make reading as easy as is consistent with the theme.

The book is written in the belief that if the average citizen can be made to see and feel the need that every nation has of every other in a life which is full of mutual ties, a deep and strong foundation for peace will have been laid.

It has been a delightful privilege to have the co-operation of men who are leaders in the field of industry. Thanks for assistance are extended to Mr. E. P. Thomas, President of the United States Steel Products Company; Mr. F. H. Montgomery, President of the Knox Hat Company; Mr. J. F. Norman, President of the Bigelow-Hartford Carpet Company; Mr. S. Isermann, of Van Dyk and Company; Mr. Thomas E. Wilson, President of Wilson and Company; Mr. Samuel G. Hibben, of the Westinghouse Lamp Company, Mr. L. D. H. Weld, of Swift and Company; and Mr. C. M. Ripley, of the General Electric Company. Special mention should be made in connection with the chapter on national defense of the generous assistance given by Colonel P. W. Guiney, Q.M.C., and Captain Harold W. Churchill, Ordnance Department, United States Army. The assistance of Dr. George K. Burgess, Director of the Bureau of Standards, and of Dr. Julius Klein, Director of the Bureau of Foreign and Domestic Commerce, United States Department of Commerce, has been of great value, and The Rubber Association of America has

supplied important facts. Mr. Thomas H. Ormsbee has kindly secured valuable material. I am indebted for much help in preparing and revising manuscript to Miss Katherine Woods, who has read the entire material, to Miss Edna C. McKnight for assistance with the index, and to Miss Helen Cunningham. Throughout, the intelligent and painstaking work of my own secretary, Miss Mary A. Glen, has been of the utmost value. Aid has been so generously given by many others that I must ask them to accept a general statement of cordial appreciation merely because they are so numerous that space does not permit doing otherwise.

WILLIAM C. REDFIELD

NEW YORK, *January 7*, 1926

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DEPENDENT AMERICA

DEPENDENT AMERICA

CHAPTER I

BREAKING GROUND

EVERY one knows that the United States conducts an export and import trade of large extent, but few think it concerns them personally, and outside of our great centers there is little conscious interest in it. Men are at labor or absorbed in business or professional work; their families are occupied with domestic duties and pleasures. Were it suggested to them that in their individual lives they daily depended upon some element in our foreign trade they would smile incredulously. Few visualize the extent to which the products of other lands enter into all our activities, rural as well as urban. Our enormous home market and vast internal trade are so near and visible that even a distinguished banker has been led to speak of our export commerce as relatively immaterial.[1] It is not surprising, there-

[1] The ratio of our export trade to domestic production is put by the National Industrial Conference Board as 8.5 per cent in 1923. Our export and import trade combined is stated at 16 per cent. Cf. *The Inter-Ally Debts and the United States*, National Industrial Conference Board, Inc., New York, 1925, p. 237.

fore, that men and women whose pressing occupations allow them no time or opportunity to study our external trade should think it does not affect them in any practical way. The more or less mythical question, 'What have we to do with abroad?' would be sincerely asked by great numbers of persons who assume that a correct answer would be found in the words, 'Very little.'

In the succeeding chapters an effort will be made to show that this great nation and every one of its individual citizens are united to the rest of mankind by ties that reach into the ordinary occupations of every life and that affect each of us every day. These bonds may be unseen and unknown, yet they are too strong to be broken. Their rupture, were it possible, would react adversely upon every home.

What, then, are our true relations to other countries? How intimate, how necessary are they? Are they matters of mere luxury or comfort or convenience which we could, if we chose, lay aside as a man gives up some indulgence, or are they of the essence of our personal lives? All the facts are not obvious; many of them are obscure. A housekeeper buying domestic supplies from a mail-order house or a department store might be amazed to be told she was getting goods from abroad that her own country could not supply, but such is

often the case. Her kitchen equipment and personal apparel witness to it. There is a story behind even a tin can that will lead one into three continents.

In a bank circular of September, 1925, are these words:

> The United States occupies a position as the world's chief creditor nation. . . . No other nation ever before was at one and the same time the world's greatest producer of goods, exporter, reservoir of capital, and dispenser of credit. Our place is one of dominant power. . . . The United States occupies an altogether unique position in world affairs.

No one questions the truth of these words. We accept as a matter of course statements which place our country at the head of the nations in all that makes for material power. We are not alone in this, for men everywhere concede that our position is one of supreme economic strength. It would be easy to match the most self-confident outpourings of American enthusiasm with the sincere if reluctant admissions of foreign observers. If it were said that the material contribution of the United States was more important to the world's economic life than that of any other nation, few would contradict it.

The United States occupies less than 6 per cent of the territory of the world and has but little over

6 per cent of the world's population. Yet a responsible authority [1] states:

> The United States is more richly endowed with material . . . than any single country of the world. In regard to material resources we have coal, iron, copper, water power, petroleum, cotton, lumber, crude salts. Our resources far exceed those of our industrial competitors. . . . During our entire history we have mined perhaps a half of one per cent of our coal reserves. Our known reserves of iron amount to about three to four billion tons. . . . The United States produces 60 per cent of the world's pig iron output, 53 per cent of copper, 43 per cent of coal, 72 per cent of petroleum, 52 per cent of cotton, 52 per cent of lumber, and we have 40 per cent of the world's developed water power. Yet our most important resources have scarcely been touched.

Our farms provide more wheat, corn, and potatoes than those of any other nation. We hold most of the world's gold in our possession and read of an annual increase in our wealth reckoned by billions and of savings enormous in amount and all but universal in extent. Our national debt is being steadily diminished and the Treasury so overflows that the reduction of federal taxation is a pressing problem. We are saturated with superlatives.

It is not strange that we look at such facts with complacency and comfortably infer from them that while the world may need the United States

[1] Cf. *The Inter-Ally Debts and the United States*, National Industrial Conference Board, Inc., New York, 1925, p. 256.

the United States itself does not in any real sense need the world. Like the man in the street who said it, we, too, think we are able to get along without the help of any other country. It causes, therefore, no surprise to be told that we hold an enviable lead in the production of life's chief essentials or to read in a recent publication that 'the United States is practically independent both as concerns resources and markets.' The development of our manufactures is on a scale commensurate with the gifts of nature. It would be tiresome to recite the long list of industries in each of which our production is the largest. Communications are on a like scale. We have more than one third of all the railroad mileage, more than one half of the telephones, and far more automobiles than the rest of the world. We produce as much electricity as all the other nations together. Furthermore, we have by science and energy placed some of the results of this endowment and development in the hands of almost every man and woman and have made them the equipment of even humble homes. These conditions, we are informed and many of us verily believe, are such when taken together as to assure our country of economic independence in world relations. So far as material advance can contribute to human happiness we have reason to rejoice in our progress.

A review speaks of Mr. Bertrand Russell as one 'whose knowledge is so wide, whose intelligence so keen, whose power not only of delightfully presenting fact and argument but of suggesting the most interesting and stimulating thought is so great.' It then quotes from his book, 'The Prospects of Industrial Civilization,' written in collaboration with Dora Russell, as follows:

> It is, of course, obvious that the next power to make a bid for world empire will be America. America may not, as yet, consciously desire such a position, but no nation with sufficient resources can long resist the attempt. And the resources of America are more adequate than those of any previous aspirant to universal hegemony. First of all, America is self-supporting in all the necessaries of peace and war; both industry and agriculture could be preserved in almost complete efficiency without commerce with any other continent.[1]

Whatever Americans think of Mr. Russell's prophecy that we will bid for world empire, most of them will accept what he writes about our economic self-sufficiency. So far has the influence of the obvious led us.

It is true that the eagle does not scream as loudly as of old in our public discussions, possibly because the national bird is more mature and is conscious of increasing years and responsibilities. Certainly it is not because there is less material

[1] Page 88.

about which to scream: there is more. We admit our own greatness more quietly now, but we have acquired an illusion of self-sufficiency so highly developed that in many minds it is mistaken for patriotism. Mr. A. Maurice Low was not far wrong in writing:

> The American . . . is as convinced that his people are the chosen people, his race the world's greatest race, as he is that nature has endowed his vast continent with more lavish generosity than that of any other land.[1]

It is possibly out of this mental attitude that current phrases have grown, harmless in themselves, perhaps helpful at times and places, but revealing an outlook which is intensive rather than extensive. Among such are 'a one hundred per cent American,' and 'God's own country' as applied in that humorous exaggeration which is our pleasant habit to the United States. It is good to be an American and to appreciate the vast and varied natural endowment of our beloved country and the wonderful results that have come from their use, and to be grateful for all. Yet few would deny that patriotism should be both unselfish and intelligent and mere geographical egotism is neither. Patriotism is the enlarging

[1] Cf. *America at Home*, published by George Newnes, Ltd., London, p. 220.

summit of an expanding series whose lesser members are parochialism and provincialism. It cannot find satisfaction in self-praise or be content with self-service. It must expand beyond limited nationalism if it is not in turn to find a superior. The wonderful work of Russian relief, the outstanding success of the Near East relief, the refunding of the Boxer indemnity, are fine examples of our ability, still too latent, to look beyond ourselves. They were steps on a way in which we have far to go.

Having, however, a great inheritance which has been so developed through free initiative that there is in our hands a mass of material resource such as no nation ever had, it is but human that we should glory in it. We do so glory, accepting our primacy as a normal fact, the well-deserved reward of wise institutions and individual effort. The idea of our being in any real sense dependent upon others in this day of our power is repugnant to many and ridiculous to most. In all our discussions of foreign affairs and our relations to them, it is tacitly assumed that we are even more free in world concerns than in domestic ones. We can do as we choose. We quote or misquote the sayings of the fathers apart from their contexts, assuming naïvely that they are applicable to conditions of which those fathers never dreamed.

Our attitude toward other lands carries at times a flavor of kindly condescension as if we were conscious of a self-sufficient and self-controlled power to which they could but vainly aspire. Many of us have a sincere wish to help the world if only we may stand apart on our own separate pedestal as we do it. We should strongly deny that we are ourselves inextricably involved in the fears and fortunes of the world.

The United States is doubtless a more nearly self-contained nation than any other, with the possible exception of Russia. The exception arises from the relatively low living standards on the part of the average Russian in a country predominantly peasant. America stands at the opposite economic extreme. The development of our standards is such that our social life makes more extensive and imperative demands than that of any other country, and this has led to an economic development which is itself exceptional. Our complex needs, however, are far beyond the power of any one nation, even our own, to satisfy. No nation is self-contained, and our lot is a common one with the others in that it is necessary for the maintenance of our life that we should reach out into all parts of the earth for the things we require. Our insufficiencies are as notable as our resources.

There has been set before us at times in our

public affairs a false god in the form of an isolate, self-contained America, standing apart from the rest of the world, living an independent life. The cult of the god is more vocal than intelligent. The supposed deity has no existence; it is a dream without reality, a creature of men's fears and ignorances, seen only when they look inward rather than outward, and seeing an imagined world, are blinded to things as they are. Occasionally, indeed, a voice is lifted, even an official one, to suggest that the image of this vision has feet of clay, but the message falls too often on the deaf ears of those who are obsessed with a delusion of separateness. The followers of this false cult may well consider anew the words of President McKinley in his last address:

> Isolation is no longer possible or desirable. God and man have linked the nations together. No nation can be longer indifferent to any other. . . . The period of exclusiveness is past.

Or give heed to these of Henry Cabot Lodge:

> The great fact is the abandonment of isolation and this can neither be escaped nor denied. . . . Isolation in the United States has been a habit, not a policy.[1]

True, the policy of isolation was said to mean political and not economic separateness. We were

[1] Cf. *The Story of the Revolution*, Henry Cabot Lodge, vol. II, pp. 246–48.

to be in the world of affairs and yet out of the world of politics. Attempts have been made to show that this is possible. But who shall fix the boundary which is always to separate economic from political affairs? Who shall limit the reaction of economic interests so that they shall never intrude upon the political field? Professor Leith reminds us that 'a fact of far-reaching significance, made obvious by the war but still often disregarded in discussion, is the overlapping of political and commercial spheres of influence.'[1] Is there, for example, no possibility of political considerations arising in connection with such a case as the debentures of the Rhine-Main-Danube Corporation recently offered in our market? These are guaranteed by the Government of Germany and that of the State of Bavaria which together own more than half of the capital stock of the corporation. Practically the whole of the balance, says the advertisement, is owned by the States of Prussia, Baden, Hesse, and Thuringia, and by various cities and towns in the Rhineland and Bavaria. Does not the continued economic contact of one country with another involve the possibility of some political relation for better or worse? Where does a close community of commercial interest end

[1] Cf. 'The Political Control of Mineral Resources,' C. K. Leith, Professor of Geology, University of Wisconsin, *Foreign Affairs*, July, 1925, p. 547.

and a real, even if unacknowledged, political interest begin? Our concern with the price of rubber from the Malay Peninsula was commercial until the Stevenson Committee took the prices of that material in hand. Did not a political element enter it when our government presented a protest respecting the prices to Great Britain? It is not new but it is true to say that wars have arisen out of economic differences and it seems to be equally true that identity of economic interest when it is understood is a potent influence for peace. The author already quoted adds:

> The public might well know more generally both for reasons of self-interest and for the sake of international accord just what minerals our country has in excess, what must be secured from foreign sources, where they can be secured, what are the vital needs of other nations and, what important explorations are now under way in various parts of the world. . . . Our experience during the war demonstrated clearly that the United States was not acquainted with these facts. . . . In this lack of perspective . . . the United States already is far behind many other nations whom necessity has taught to study these problems.[1]

We have developed the weakness of our strength. Out of our very conditions of abounding wealth and prosperity has grown a peculiar dependence on other lands. The complex demands arising from our high standards of living force us to look

[1] Cf. C. K. Leith, *op. cit.*, pp. 549–50.

to all the world to supply our wants. It is, for example, the fact that every American home is provided with an automobile that makes the price of rubber at Singapore of far more general interest to our people than it is to those of the country where the control originated. There is not a man or woman in America whose daily life is not in constant touch with that of peoples on the other side of the seas whose customs are strange to us, whose languages are unknown, of whom we may never have heard, but without whose daily toil our lives would be affected for the worse. No one of us lives through a single day without in some way getting help from all the other continents. The facts about America's power and progress are unquestioned, but the statistics themselves create the danger that we shall be so inebriated with the exuberance of our local enthusiasms as to be mentally blinded to underlying truths. We are so mistaught, or so little taught, about the world relations of our own economic affairs, are so auto-intoxicated with an illusive vision of our country's self-sufficient status, that we are reluctant to face realities.

At times even official documents partake in a degree of the illusions and promote them by statements which, until explained, are misleading. Such a one is this:

The United States is largely self-sustaining — only a small proportion of its consumption requirements being covered by imports.[1]

These words, if strictly interpreted, contain truth, but they tell only half or less than half of the truth and are, therefore, likely to deceive. A statement equally true is the following:

We have to-day great industries whose very life depends upon abundant supplies of raw materials which this country does not produce.... An adequately developed import trade is . . . scarcely less a necessity to the United States than an adequately developed export trade. In truth, the two are complementary the one to the other, forming inseparable parts of a single problem.[2]

In the following chapters we shall see what these industries are and consider whether it is true that the proportion of our requirements for which imports are needed can in any sense be correctly described as small.

Some men enjoy the delusion of our aloofness and resent the truth that takes it away. One such said recently that, of course, there were certain things like bananas, chocolate, coffee, and other tropical products which we obtain abroad, but

[1] Cf. *Commerce Reports*, published by Bureau of Foreign and Domestic Commerce, United States Department of Commerce, November 9, 1925, p. 322.

[2] Cf. *Economic World*, September 27, 1924, vol. xxviii, no. 13, p. 435.

even if these were cut off we could get along very well and for the rest we were abundantly able to take care of ourselves, and he waxed indignant, saying with some heat that it was not quite 'American' to think otherwise. Yet as he spoke he was in his own person the beneficiary of at least six countries other than his own.

There are two sides to the picture, one as real as the other. Our imports are not all or even chiefly of articles which appeal to the taste of particular groups or classes. No one, however humble, escapes their use. Against our supremacy in copper, petroleum, and cotton may be placed our deficiency in tin, nickel, rubber, and essential fibers. We are not free from the world industrially, for many of our great manufactories would be crippled in a brief time were we to be cut off from the supplies which we needs must gather from the whole circle of the earth. Opposed to the uninstructed words of Mr. Bertrand Russell may be set those of our present Ambassador to Great Britain, Mr. Houghton:

> We can no longer shut ourselves away from the rest of the world and say America is sufficient unto itself.

Vast and varied as is our national endowment it is not enough for us. We compass the earth seeking from the nations the things we need but

have not, sending to them in our turn that which they need and we have. It is true interdependence, we depending on them and they on us. The following chapters are not written to support any policy, but to make the facts plain, believing that if and when it is realized by the average citizen that his life and the lives of his children are tied by bonds of mutual interest and service to the men and women of every land, a great step forward will have been taken toward the peace of the world. Ignorance in foreign affairs is a deadly and costly sin, knowledge of mutual service to and by others sheds light on the path nations must tread.

CHAPTER II

FROM FAR AND NEAR

'The interruption,' says Professor Leith, 'of any one of the main channels of movement between nations is followed by confusion or disaster. . . . Failure to comprehend this simple fact underlies many futile attempts to close or change these routes by political action.' [1] The reference is to the world's supply of minerals, but it applies with equal force to other materials. If the German cruiser, Cap Trafalgar, had succeeded during the World War in stopping even temporarily the movement of manganese from Brazil to the United States or Great Britain, the effect upon the steel-making centers of England and America would have been embarrassing. If the Emden in her brilliant cruise through the Indian Ocean had interrupted the movement of manganese and shellac from India or graphite from Ceylon and Madagascar to the western nations or the stream of tin and rubber flowing from the Malay Peninsula and Sumatra, the result would have been disastrous. There were times in the World War when crises of this kind were visible, as when

[1] Cf. 'The Political Control of Mineral Resources,' by C. K. Leith, Professor of Geology, University of Wisconsin, *Foreign Affairs*, July, 1925, p. 545.

Italy was short of coal and when the supply of gasoline in France was nearly gone. The emergencies happily passed without disaster, but danger was at the door in each case.

The condition is not confined to times of war. It exists to-day as it did then. There are materials which the United States must draw from the Far East for which there are no known substitutes. They are necessary to the continued working of great industries. They are needed supplies for every family and provide the means wherewith we conduct our sports. In this chapter we consider three of these necessary commodities, shellac, jute, and rubber. No household in America is without them all. There would be neither baseball, football, golf, nor tennis in America if the supply of rubber were to cease. It is hardly necessary to suggest what that event would mean to the automobile industry or to any municipal fire department.

Every one knows of the helpful activities of two members of the insect world, the bee and the silkworm. No disrespect is meant to these estimable insects in saying that there is another that renders us equal service. This is the lac-insect or coccus, otherwise, *Tachardia lacca*. The bee and the silkworm are exalted among us, but the lac-bug lacks appreciation. No voice is lifted for the humble coccus and *Tachardia lacca* swarms unsung.

These insects, whose home is India, produce lac. The young bugs swarm twice each year and live for about six months. They affix themselves in large colonies to the branches of certain trees and perforate the bark with their beaks. They suck out the sap and give it out as an excretion which hardens on contact with the air and forms about the bodies of the insects a scale called 'lac' which protects them from their enemies. Each female insect produces a family of about one thousand and gives her life with it. About five per cent are males. Twice each year, usually in June and November, the crusted branches are broken away by the natives and the product in this form is called 'sticklac,' from which, by separating, cleansing, and melting the lac and breaking it into flakes, the article which we call 'shellac' is produced, together with other forms of the same material called 'button lac,' 'tongue lac,' 'garnet lac,' etc. The material is distributed to the world through the port of Calcutta.

Few commodities find more manifold use. An official report says, 'Its applications are increasing and it has not been found possible to replace it by some other substance.'[1] The report of the Industrial Laboratory of the Nizam of Hyderabad, from

[1] Cf. Bulletin 2, 1925, Industrial Laboratory, Department of Industries and Commerce, H. E. H. the Nizam's Government, Hyderabad, Deccan, India, p. 3 *et seq.*

which the above quotation was made, points out that lac is one of the substances necessary in the making of spirit varnishes used for furniture, that it is utilized in connection with electrical machinery for cables and as an insulating agent, and is required in the manufacture of hats. Serious attempts have been made to produce a lac substitute, but without successful results. Bakelite and other compounds have displaced shellac for some uses, but as one door has closed others have opened and the lac-bug is as necessary a servant to man as ever. The United States is the largest consumer of the various forms of lac, which we import chiefly in the form of manufactured shellac.[1] The United States Bureau of Standards says that shellac is a component of buttons, phonograph records, imitation ivory, and sealing wax; that it is used in fireworks, explosives, and as a binder in abrasive wheels. One of the largest single uses for it is in anti-corrosive and anti-fouling paints specified by the Navy Department and the Shipping Board for protecting the hulls of steel vessels. But this is far from being all. It is in the receiver of every telephone. As a varnish it appears upon our floors, musical instruments, and toys, and it is extensively used upon willow and

[1] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Shellac,' revised edition, 1921, p. 23.

rattan goods, in various leather dressings and for waterproofing. It is found in oilcloths, linoleum, shoe polishes, in trunks, picture frames, moldings, checkers, dominoes, mirrors, and many more articles in general use. It would be an interesting and doubtless an amusing experience for any man, woman, or child to see if a day could be passed without employing shellac in one or another of the countless forms in which it finds use; and it all comes from a small bug which no one in America ever sees and about which little is said or heard in this country which is the chief beneficiary of the fruitful services of this small, orange-red insect.

Official records show the importation in the calendar year 1924 of 24,550,000 pounds, of which more than 22,400,000 pounds came from British India, the balance in scattering amounts from Siam, Ceylon, French Indo-China, and the Straits Settlements, with a considerable quantity, about one million pounds, trans-shipped through England.

An incident illustrates our dependence upon India for a regular supply of shellac. A market report stated a year or more ago that the shellac market was disturbed as a result of a shortage of supply which apparently would continue for some time. It appeared that the steamship Chalister, with 7200 bags of shellac on board which was

being rushed through the Indian Ocean and the Red Sea to 'alleviate the shortage' in this country, was reported to be on fire outside Port Said in the eastern Mediterranean Sea. It was said that there was certain to be two months' delay in the delivery of this shellac, which might possibly be damaged. As a result prices had advanced here, for 'this lot had been relied on to take care of absolute needs.' Here we have a touch of the romance of modern commerce. The story begins with the swarms of tiny bugs digging into the bark of the trees in India and spreading the sap about their bodies. Then come the natives breaking away the branches and by their crude processes making the sticklac into the shellac of commerce. Transportation to Calcutta follows and loading upon the British steamer. Halfway on its long voyage fire breaks out. Meanwhile, New York, and through New York, the United States was waiting for this vessel to arrive, relying on it, says the account, to meet 'absolute needs.' Could the tiny insects know how important their life and work was to the great Republic of the West, they would burst with pride.

One afternoon in the summer of 1924, wandering through the streets of Bristol, Virginia, the writer saw an exhibit in a store window and paused to look at it. No one else seemed attracted by the

ordinary bag containing binding twine that interested him. His thoughts were far away in Washington and in Calcutta. The binding twine brought the memory of a day during the war when the authorities of Yucatan had refused to allow twelve American ships in the harbor of Progreso to be loaded with the henequen (sisal) for which they had come. The material was sorely needed in the United States to make the binding twine for use with the reaping machines in the coming wheat harvest. Our manufacturers of that twine were urging action by our Government to secure the shipment of the henequen, failing which, they represented, the emergency was not remotely distant of serious difficulty in harvesting our crop. The emergency passed. The henequen came out and was duly made into binding twine and the wheat harvest was secured, but no one who lived through that experience will forget the sense of dependence for a necessary supply upon the action of another Government quite beyond our control. Nor did the difficulty cease with the actual shipment of the needed material. Through an organization created for the purpose the Government of Mexico afterward raised the price of henequen fiber several-fold. There was and is no available substitute. The United States does not produce most of the fibers it needs. Indeed, there is but

one, cotton, that we can furnish in sufficient quantities for our own wants; for all the rest we have to look to other lands. No farmer throughout our great Central West operates his self-binding reaper in harvesting his wheat save by using a material which we have to obtain from Yucatan at prices which we have been unable to control. Thus, one of the vital processes in gathering our daily bread is in an important sense beyond our jurisdiction. In the first six months of 1925 we imported 85,199 net tons of henequen fiber from Mexico, an increase in weight of 73 per cent over the like period of the previous year. The value of the six months' imports was $12,516,000, an increase of 117 per cent.

The other memory that was stirred that afternoon in Virginia was of a day in Calcutta of which a part was spent in the great mills which were weaving burlap out of the native jute. The mill and its equipment were modern, the superintendent was an efficient Scotchman, the labor was entirely Hindoo. The superintendent talked about the workers who gathered the jute and prepared it for shipment to the mills and those others who, under his direction, were doing the spinning and weaving. He said the workers were paid very little, that their labor was as inefficient as it was cheap, and that an unusual amount of supervision

was necessary to keep the plant moving well. Watching these Hindoo weavers at their looms and knowing that the products of their labor were coming to the United States to be in turn the materials which our own labor was to use, one did not need to be told of the interdependence of peoples. There it was before the eyes; no one could avoid seeing that the oceans were not separating, but connecting, the toilers of the two hemispheres.

It needs but little inquiry to find how complete our dependence is upon India for the products of jute and how essential they are to us. In January, 1921, the jute yarn and twine manufacturers of the United States presented a brief to the Ways and Means Committee of the House of Representatives. From that brief the following is taken:

Raw jute is grown only in India, with the exception of a very small percentage in China. It is the cheapest fiber known. The manufactured products are necessary, innumerable, and indispensable for the commerce of the United States.

Every package of medium bulk is tied up with jute twine. The post office alone uses approximately 2,500,000 pounds annually. Every bale is covered with jute burlap. We estimate jute yarn is the foundation of 80 per cent of the carpets, rugs, oilcloths, and linoleums manufactured in this country. It is used by the electrical companies as insulation for all their cables and by fuse manufacturers to protect fuse. Normally 300,000

pounds of jute twines are used daily in the distribution of merchandise in this country.

If it causes surprise to realize that our Post Office Department depends upon India for its supply of twine, the surprise will not be lessened when we think that the entire cotton crop of the United States is shipped in bales which are covered with a product woven from Indian jute. Cotton bagging, the coarse fabric used for covering raw cotton, is woven either from jute butts, which are the ends of the jute fiber too coarse for making burlap, or else from this material mixed with old cordage, waste, and bagging. For a cotton crop like that of 1920, which including linters was 13,860,000 bales, about 97,000,000 yards of covering were required.[1] We produced in 1919 from material which was original in India 75,200,000 square yards of jute bagging for our cotton.

The United States is the largest consumer of burlap, taking two thirds of the jute cloth exported from India and half of that from Dundee, Scotland, which is the jute center for Great Britain. This plain, woven jute cloth called 'burlap' is the world's chief sacking and wrapping textile material, ranging in width from 27 to 150 inches and in weight from 6 to 16 ounces to the

[1] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Jute Cloths,' revised edition, 1922, p. 10.

linear yard. More than four fifths of the burlap which comes to us is made into bags for grain, feed, flour, granulated sugar, and other commodities, or is used for wrapping a wide variety of products from cotton cloth to machinery, for tailors' padding and upholstering materials. About 33,000,000 square yards were used in 1919 for oilcloth and linoleum. The domestic production of jute cloths other than cotton bagging, says our 'Tariff Survey,' 'has always been negligible.' [1] The quantities which we bring from India are enormous, for, excepting cotton alone, a greater weight of jute is produced than of any other fiber.

It is not easy to visualize the import from India in the one year ending March 31, 1924, of 946,238,000 yards of gunny cloth (burlap) and in the same year of 33,157,000 gunny sacks besides.[2] In the calendar year 1924 we also took from India 67,900 tons of raw jute and jute butts, and from Dundee 53,800,000 pounds of the better grades of burlap cloth used chiefly by tailors and for making linoleum and oilcloth, all of which was original in India. That enormous yardage of Indian gunny cloth if it were of continuous length would be more

[1] Cf. *supra*, p. 12.

[2] Cf. *International Trade in the Minor Fibers*, by Leslie A. Wheeler, Trade Information Bulletin 289, November, 1924, Bureau of Foreign and Domestic Commerce, United States Department of Commerce, p. 3.

than sufficient to wrap around the earth twenty times. Its length is more than twice the mean distance of the moon from the earth. The weight of the burlap and the jute sacks received from India in 1923 is recorded as 319,276 net tons.[1] This means the average receipt of over a thousand tons every working day in the year, or, stated in yards of cloth alone, over three million yards daily. Shipments of burlap from Calcutta to the United States from January 1 to October 1, 1925, were 795,866,000 yards, an increase over the like period in the previous year of 87,869,000 yards. Receipts during September, 1925, of 80,000,000 yards were 'considered small by the trade.'[2]

As many things in every home will remind us, if we trace them to their origins, of the helpful service of the small beetle that supplies us with shellac; as every loaf of bread may recall that we harvest our wheat with the aid of Yucatan; so, few households escape some measure of dependence upon India for the use of jute. Thousands of men are walking about America unconscious that part of their coat-linings came from Asia. Millions of housewives cause their oilcloth or

[1] Cf. *International Trade in the Minor Fibers*, by Leslie A. Wheeler, Trade Information Bulletin 289, November, 1924, Bureau of Foreign and Domestic Commerce, United States Department of Commerce, p. 5.

[2] Cf. *New York Times*, Market Report, October 16, 1925.

linoleum to be cleaned without a thought of the Hindoo worker whose labor made their possession of it possible. Indeed, if those housekeepers look keenly enough at the linoleum they may see one or two other continents hidden there, namely, Africa and South America as well as Asia. For whence came the cork save from Algeria, and there is at least a fair chance that the linseed oil originated in Argentina whence nearly fourteen million bushels of flaxseed for making that oil came to us in 1924.

Singapore is on the opposite side of this terrestrial ball, possibly almost beneath our feet, nearly or quite as far from America as one gets on any direct road around the earth. Very foreign to our eyes it is in the pageant of many races and costumes which it presents and in the adaptations of its structures to the tropical climate. Yet even a glimpse beneath the surface of things reveals much that is familiar. The daily round of business there deals with commodities that are common with us, and not only so, but which are often intended for our use. One hears talk of gutta-percha, copal, rattan, going to America, and of rubber — above all things else of rubber.

One day the writer went out to a rubber plantation north of the city to see something of the processes of cultivation. The English superin-

tendent politely showed him about in the torrid heat and answered a stream of questions with courteous frankness. A gang of black Indian laborers, naked save for a breech-cloth, were digging a drainage ditch, their bodies glistening in the sun with sweat. If memory serves correctly he said they were paid an English shilling daily and that they were fair workers on matters requiring only unskilled labor, but were almost helpless beyond a narrow sphere of that kind. It is difficult to imagine labor as working strenuously under that sun.

Such widespread publicity has been given in recent years to the facts respecting our dependence upon the Far East for rubber that it is not necessary to dwell upon it. The spectacle of our Ambassador presenting to the British Government an official protest against the action of a semi-official British committee respecting the control of rubber prices has not been soothing to American pride, however necessary it may have been. For our present purpose it will suffice to show how far this particular element of our dependence reaches into the currents of our social life. Consider, then, an industry which in 1923 contained 529 operating companies employing 160,000 persons. More or less dependent upon these industries were over 100,000 dealers in tires and as many hardware

dealers selling rubber hose and other products, plus tens of thousands of druggists handling rubber sundries. The manufacturers produced rubber goods to a yearly value of nearly a billion dollars and paid annual salaries and wages of $231,000,000.[1] In one American city, Akron, Ohio, over 100,000 rubber tires and tubes are daily manufactured, with many miles of belting and hose. A large rubber manufacturing concern in that city states that more than 34,000 different rubber products are made there. Between 200 and 250 carloads of rubber goods are said to be shipped from Akron every twenty-four hours. Small wonder that an English writer should say in September of 1925:

> America is the great consumer of raw rubber, taking between 70 and 80 per cent of the world's total production, but she does not directly control a single ton of the raw material. . . . American manufacturers are entirely dependent upon alien sources for the very existence of the enormous industry they have built up in the course of practically a single generation. . . . The dependence on British and Dutch sources may be said to be complete, for the trade in wild rubber has become negligible.[2]

It is but a few years since the production of rubber boots and shoes was the largest single

[1] Cf. 'The Rubber Industries,' *Census of Manufactures*, 1923, p. 6, Bureau of the Census, United States Department of Commerce, 1925.

[2] Cf. Edwin Oliver, Assistant Editor of the *Rubber Age*, London, in *The Landmark*, September, 1925.

element of the rubber industry. That was the case as recently as 1901, but in 1923, as against 16,440 tons of rubber used in boots, shoes, and their parts, more than 220,000 tons were consumed in making tires, tubes, and their accessories. The demands of the automobile industry form the great overshadowing factor in rubber manufacture in this country.

The material comes from the islands and the coast lands of southeastern Asia, the western point of shipment being the island of Ceylon, but the trade as a whole centering around the port of Singapore. In the year 1924 we imported 734,845,000 pounds of crude rubber, of which 407,849,000 pounds came from the Straits Settlements, 131,762,000 pounds from the Dutch East Indies not far distant, and 61,074,000 pounds from Ceylon. Brazil, which once was the chief source of supply, sent but 29,025,000 pounds. The situation, however, is not as wholly beyond the control of the American rubber manufacturing industry as the above facts would seem to indicate, for some years ago American companies made large investments in rubber plantations in Sumatra from which they are now drawing supplies. The United States Rubber Plantations, Inc., control 172 square miles in Sumatra and on the Malay Peninsula, with 5,000,000 rubber trees. Two American

companies have each 20,000 acres of rubber lands under development in Sumatra and others control smaller but still extensive plantations. From semi-official sources related to the Dutch East Indies it is learned that, conservatively estimated, these American investments represent a capital of $25,000,000. It throws light upon the size of our rubber industry to say that, based upon the conservative estimate of its requirements for 1922 of 290,000 tons, there would be required the output under favorable conditions of over 2,160,000 acres, which would mean, on the basis of $300 per acre, an investment of almost $650,000,000. There would be required for cultivation not less than 650,000 laborers with the due proportion of foremen and superintendents.

The situation is so serious from the American standpoint that the Department of Commerce is now engaged in a study of the possibilities of developing rubber plantations in the Philippines and Latin America, and private negotiations are being conducted for the purchase of further plantations in the Dutch East Indies and for concessions in Liberia. The Rubber Association of America reports our consumption of crude rubber in the first nine months of 1925 as 274,947 tons of 2240 pounds each, together with a production of reclaimed rubber of 84,785 similar tons. The im-

portations of crude rubber for the first nine months of 1925 were 637,265,000 pounds, an increase over the like period of the previous year of 23.9 per cent in weight. The value of these importations for the six months was $258,350,000, an increase in price over the previous similar period of 117.2 per cent. Very clearly this is a situation in which we are far from having our own way. This big increase, says the *New York Times*, in the quantity imported, irrespective of the cost, further evidences the activity of our manufacturers 'who are entirely dependent upon foreign countries for the rubber which they use.' [1]

Within the last twenty years there have been great changes in the sources of rubber production. Since 1905 the share of our supply which came from wild rubber has been diminishing and plantation rubber has taken its place until in 1923 more than nine tenths of all came from plantation areas in the Far East. Great Britain controls in various ways 72 per cent of the acreage of plantation rubber. Contrasted with this centralized control of production in the hands of one nation is an almost equally centralized control of consumption in the hands of the United States, for out of American factories come fully three quarters of all the rubber goods in the world. Our consumption

[1] Cf. *New York Times*, September 27, 1925.

during the first eight months of 1925 has been rather more than one thousand tons per calendar day.

The industry is American in its origin through the discoveries of Charles Goodyear in 1839. It is American in its development and its products go all over the world, yet it has to depend upon other countries for the material with which to work. It is in this respect somewhat analogous to the cotton textile industry of Lancashire with the difference that the English textile manufacturers, having organized for that purpose, are steadily developing supplies of cotton from British controlled territory. May we hope that the great American rubber industry will find a similar opportunity. The industry as a whole is not yet a century old, though its great growth has taken place within the last score of years.

Something has been heard of late to the effect that America should produce its own rubber. 'This makes a strong sentimental appeal,' says one of the great rubber manufacturing companies, 'but unless applied in a practical way any attempt to realize such an ideal may prove dangerous' in view of the difficulties involved. They point out that the areas suitable for growing rubber, particularly Hedea or fine Para on which the industry depends, are limited geographically, and add, 'It is incon-

ceivable that this tree can ever be grown within the confines of the United States. This being the case, the American industry must rely upon its own tropical possessions or foreign countries.'[1]

In this chapter we have considered three of the materials for which we are dependent upon that portion of the Far East which borders upon the Indian Ocean and have pointed out that there is no American household into which in some form one or more of these products, and usually all three of them, do not enter. It is well in passing to further studies to refer to the words used by the United States Tariff Commission in speaking of the currents of world commerce:

> Few people have an adequate conception of the multitude of raw materials employed in the many-sided output of modern industry. Fewer still realize their wide dispersion over the world.[2]

We shall err, however, if we think that shellac, jute, burlap, and rubber as they reach us are crude raw materials. They are manufactured articles. Each represents the result of industrial labor and in the case of rubber and jute the industries are well equipped and organized.

[1] Cf. *A Lecture on Rubber*, The Educational Department, United States Rubber Company, New York, 1924, pp. 13 and 14.

[2] Cf. *Dictionary of Tariff Information*, United States Tariff Commission, 1924, p. 211.

CHAPTER III

OUR GREATEST INDUSTRY

EVERY American uses steel and it would be hard to find an industry more truly domestic than that which produces it. Our leading steelmakers have no rivals in the volume or variety of their output and their products go all over the globe. We make over half the world's steel. Miles of American barbed wire enclose great areas in Argentina. A large warehouse in Java bears the name of an American steel company. American locomotives draw trains in every continent and in Europe, Asia, Africa, and Australia our machinery and steel products are of widespread use. An American automobile came to the hotel door in Agra to take the writer to the Taj Mahal. Science, capital, and labor have combined to make our manufacture of steel the most important enterprise of the kind in the world.

But if we say that with native fuel, under our own leadership, with domestic capital, we transmute our ores into steel which we send in many forms to all the world, have we made a full statement of the related facts? Not quite. For this great industry must reach as far out into the world

as its products go for materials with which to make them. If it were not for supplies gathered from overseas there would be serious interruptions to the processes of Pittsburgh and Gary. Many great industries, the manufacture of automobiles among them, would be embarrassed if not suspended, were the inward current of materials for making steel to cease its flow.

The production of steel is typical of the dependence of the whole United States upon the world in the respect that, while it is so highly developed on the scientific and executive sides as to be the leading exponent of American methods of mass production, it nevertheless cannot function by itself alone. In 1921 the President of one of the subsidiaries of the United States Steel Corporation was asked for information about the importation of elements used in steel-making. The list received in reply gives the quantities and countries from which the various materials were brought for the years 1919 and 1920 and covers fourteen and a half typewritten pages. It shows forty commodities brought from fifty-seven countries.[1] Among

[1] Argentina, Australia, Austria, Belgian Kongo, Belgium, Bolivia, Brazil, British India, British South Africa, British West Africa, British West Indies, Canada, Chile, China, Colombia, Cuba, Czecho-Slovakia, Denmark, Dominican Republic, Dutch East Indies, France

the commodities imported for this purpose were aluminum, antimony (ore and metal), asbestos, asphaltum, chromite, coal, copper (ore, concentrates, and metal), ferroalloys, fluorspar, graphite, iron ore, jute, lead (ore and metal), magnesite, manganese, nickel, nitrate of soda, crude mineral oil, linseed oil, palm oil, ferromanganese, ferrosilicon, pyrites, tin (ore and metal), and tungsten ore.

Three years later, on November 5, 1924, in response to an inquiry as to conditions then current, the same officer wrote:

> Without regard to quantities or values, the facts as to the imported materials entering into steel production remain substantially the same as when I sent you the list mentioned in your letter.

The commodities and the countries from which they come vary. Some of them, of course (e.g., coal, copper, lead, iron ore), are produced on a great scale in the United States, but are international

French Africa
French Indo-China
French Oceania
Germany
Great Britain
Greece
Guatemala
Honduras
Hongkong
Hungary
Italy
Japan
Liberia
Madagascar
Mexico
Morocco
Netherlands
Newfoundland and Labrador
New Zealand
Nicaragua
Norway
Panama
Peru
Philippine Islands
Poland and Dantzig
Portugal
Portuguese Africa
Russia in Asia
Russia in Europe
Spain
Straits Settlements
Sweden
Trinidad and Tobago
Turkey in Asia
Turkey in Europe
Venezuela

commodities also. In 1923 we imported from Great Britain 813,000 tons of coal and from Australia and New Zealand over 100,000 tons; smaller amounts came in the two following years. We brought 156,000 tons of copper from Chile in 1924 and lesser but appreciable quantities from eleven other countries, including Portuguese Africa and Peru.[1] Mexico sent us in the same year 122,000 tons of lead and considerable lots came from Chile, Canada, and Peru.[2] The United States imported iron ore to the extent of 2,768,000 tons in 1923 [3] and 2,047,000 tons in 1924.[4]

Any study of the use by the steel industry of materials brought from abroad must include alloy steels. Before taking up this phase of our subject let us consider an element that enters into the manufacture of almost all steel, namely, manganese. There is probably no rail on our railroads,

[1] Spain, 13,551 tons; Canada, 41,519 tons; Mexico, 48,088 tons; Cuba, 11,961 tons; Peru, 35,131 tons; Portuguese Africa, 62,444 tons. Cf. *Year Book*, 1924, American Bureau of Metal Statistics, p. 27.

[2] Cf. *Foreign Commerce and Navigation of the United States*, Bureau of Foreign and Domestic Commerce, United States Department of Commerce, 1924, p. 261.

A glance at the export side shows a much larger outward movement in copper — in 1924, 547,800 tons to thirty countries. In lead we exported, in 1924, 10,660,000 pounds from domestic ore and 144,860,000 pounds from foreign ores to twenty countries, half of it to Great Britain.

[3] Sweden, 749,000 tons; Cuba, 692,000 tons; Chile, 634,000 tons; Algeria and Tunis, 345,000 tons.

[4] Sweden, 317,000 tons; Cuba, 285,000 tons; Chile, 1,144,000 tons; Algeria, and Tunis, 192,000 tons.

no truss on our bridges, no beam in any steel structure that was made without the aid of this metal.[1] Nearly all the manganese consumed in this country goes into steel in the form of spiegeleisen or ferromanganese. Small quantities enter into manganese copper,[2] nickel castings, nickel silver, and special alloys.[3] Special steels are produced in which manganese is an alloy element. Of such are made the rails which must endure the wear on curves.

Our domestic manganese ores are lean and situated far from points of consumption, often distant from railroads. We have high-grade ores in such limited quantities that our native resources, if fully used, will supply us only a few years. Before 1914 we produced less than one per cent of our manganese requirements, rarely exceeding 4000 tons of high-grade ore [4] (imports 1914, 288,800 tons; 1924, 505,000 tons). War prices caused our domestic output to rise to 300,000 tons of ore in 1918. That was not enough (our

[1] A patent process is in extending use for making manganese-free steel, but as yet its product comprises but a small proportion of our steel output. Any attempt to make our general steel product without using manganese would be disastrous.

[2] Cf. *A List of Alloys*, American Society for Testing Materials, 1922, pp. 16, 17.

[3] Cf. *Thermit Carbon-Free Metals*, Pamphlet 20, fourth edition, Metal and Thermit Corporation, New York, p. 6.

[4] Cf. *Dictionary of Tariff Information*, United States Tariff Commission, 1924, p. 317.

imports that year were 491,000 tons). In 1919 our output dropped to 55,000 tons (imports 333,000 tons) and fell to 13,000 tons in 1922 (imports 425,000 tons).[1]

The enlarged use of open-hearth steel, which requires ferromanganese, instead of bessemer which takes spiegeleisen, has increased our dependence on foreign supplies. The ores of Brazil, India, and Russia are even richer than our high-grade ores and we must look to those countries for this material so essential to our largest industry.[2] American interests secured in June, 1925, a concession to operate manganese mines in the Caucasus and part of our supply, therefore, will come from the Soviet Republic of Georgia (Russia). The outlook of our steel industry, therefore, is to Russia, India, and Brazil. It is obvious that this

[1] Cf. 'The Manganese Situation,' *Commerce Monthly*, September, 1925, The National Bank of Commerce, New York, p. 27.

[2] In 1924 from Brazil, 54,938 tons; from Russia and through Turkey in Europe, 93,654 tons; from British India, 54,566 tons, all reckoned by manganese content. Cf. *Foreign Commerce and Navigation of the United States*, calendar year 1924, United States Department of Commerce, pp. 258–59. Lesser quantities reach us from Cuba (23,065 tons of ore, 1924) and British West Africa (23,034 tons of manganese content, 1924). We brought 36,856 tons ferromanganese from England in 1924 and 10,277 tons from Norway. Our imports of manganese ores, ferromanganese and ferromanganese alloys for the first six months of 1925 were 166,589 net tons. This weight refers to manganese content.

An excellent table of manganese importations in recent years is found in *Commerce Monthly*, September, 1925, The National Bank of Commerce, New York, p. 29.

may bring us into touch with political movements in Russia and India. American interests control the Brazilian mines and they may be our protection against interruption by political causes of our supply from other countries. We cannot continuously obtain this commodity from our own known resources.

The metal that is popularly called 'chrome' is also widely used by the steel industry in the form of ferrochrome, an alloy of iron and 60 per cent or more of chromium. The ore of chromium, called 'chromite,' is widely distributed over the globe, but our national share of it is not abundant in quantity or as a whole high in quality. An official report[1] says, 'With foreign chromite entirely excluded it is estimated by the Geological Survey that the known resources of the United States would be depleted in five years or less.' Yet, says the same report, it is of 'prime military importance as the raw material for the ferrochrome used in making chrome steel armor plate, projectiles, and high-speed cutting tools.' It is necessary for rifle

[1] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Ores of Ferroalloys,' revised edition, 1921, pp. 33 and 34; also *Tariff Information Surveys*, United States Tariff Commission, 'Ferrochrome,' revised edition, 1921, p. 94 *et seq.*

Another statement says, 'about twelve years' normal supply.' Cf. *World Trade in Chromite*, H. M. Hoar, Trade Information Bulletin 252, Bureau of Foreign and Domestic Commerce, United States Department of Commerce, p. 22.

and machine-gun barrels and bayonets; is used for high-grade castings, rock-crushers, stamp-mill shoes, parts of airplane and automobile engines, and for axles, dies, safes, tires, springs, razors, file and cutlery steel, etc.

But the demand for chrome is not limited to the steelmaker. It is, says the United States Tariff Commission, 'an essential raw material in the chemical, dyestuff, paint and tanning industries.'[1] Through these five manufacturing groups, therefore, this element of chrome touches every citizen more or less nearly. It forms part of 'stellite' and other stainless steels,[2] of the resistance elements in electrical heating and heat-measuring devices, and in electrical furnaces.[3] Important pigments are made from its chemical compounds. Chrome yellow, chrome orange, and chrome black are used in calico printing and dyeing; chrome colors are used in the ceramic arts. As a refractory lining for open-hearth steel furnaces chromium has no equal. An interesting use which has recently developed is in connection with

[1] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Ores of Ferroalloys,' revised edition, 1921, p. 33.

[2] Cf. *A List of Alloys*, American Society for Testing Materials, 1922, pp. 28–30.

[3] Cf. article, 'Types of Electric Heating Appliances for Industrial Use,' by Robert M. Keeney, General Engineer, Westinghouse Electric and Manufacturing Company, in *Chemical and Metallurgical Engineering*, November, 1925, p. 855.

printing our money. The steel engraved plates used in the Bureau of Engraving and Printing are now plated with chromium .002 inch thick. It gives better definition to the engraved designs and makes the plates wear much longer. It saves expense and makes the work of the counterfeiter more difficult. Look at the back of a dollar bill, or a five or ten. That green ink or pigment is chrome green. This chrome green is a mixture of chrome yellow and Prussian blue precipitated together, chrome yellow, barium sulphate, and some calcium carbonate. The printing is done, as has just been said, by engraved steel plates themselves plated with chromium. Here is the world abroad close at hand, even in our pockets. No substitute for chromium is known to the steel industry and nothing else gives the same results in tanning.

Our domestic chromium resources are small compared with those of Rhodesia, New Caledonia, Asia Minor, Russia, and Brazil. These countries possess millions of tons of high-grade ores. The pressure of war raised our domestic product in 1918 to about 125,000 long tons (more than was then needed). The next year we produced only 5079 tons (imports 61,404 long tons); in 1920 but 2542 long tons (imports 150,275 long tons). Substantially our entire supply to-day comes

from abroad.[1] The Tariff Commission states, 'from present indications [1921] the United States will have to rely upon foreign countries for the greater part of its supply of chromite'[2] and that 'even accepting the top estimate of all [our] known deposits . . . there is not yet enough high-grade ore in sight to serve as the basis of a permanent industry.'[3]

It provides food for reflection to realize that the desirable sources of a material necessary for some of our largest industries and for national defense is under foreign control.[4] We are the world's largest users of chromite and even a temporary stoppage of the supply would cause serious disturbance. Until every source in our own land is developed, and it is doubtful if this can be done

[1] In the calendar year 1923 we imported 128,763 tons (Rhodesia, 67,744 tons; New Caledonia, 7410 tons; British India, 29,238 tons), in 1924, 118,343 tons (Greece, 13,390 tons; Cuba, 8145 tons; British India, 7335 tons; New Caledonia, 4392 tons; Rhodesia, 85,081 tons). In both these years there were imports also of ferrochrome and chromium compounds (1923, 3,521,930 pounds chiefly from Sweden, France, and Norway: 1924, 948,256 pounds, Sweden, 806,312 pounds; France, 132,344 pounds). A limited amount of very high-grade ore is found in Guatemala.

[2] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'The Ferroalloy Industries,' revised edition, 1921, p. 97.

[3] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Ores of Ferroalloys,' revised edition, 1921, p. 44.

[4] Cf. *World Trade in Chromite*, by H. M. Hoar, Trade Information Bulletin 252, Bureau of Foreign and Domestic Commerce, United States Department of Commerce, Introduction, and pp. 1–5. This is a part of the Investigation of Essential Raw Materials authorized by the 67th Congress.

on an economic basis, we must acknowledge with what grace we can our dependence upon others. In time of utter necessity chromite of a low grade, difficult and costly to process, may be available in the United States, but to-day there is no stimulus to find American deposits and, if they exist, to develop them.

In a recently published table [1] of the world's production of tin ore the space opposite the name of the United States for 1923 and 1924 is blank. We produce no tin, yet we are the largest maker of tinplate and consume more than half the tin output of the earth. In 1923 we brought in 80,200 tons; in 1924, 73,000 tons. The United States is, says an official report, 'dependent on foreign tin supplies.' [2]

In the southeast corner of Asia, where the Malay Peninsula sticks out like a long finger into the Indian Ocean, is found the greatest source of the world's tin. The deposit begins in southern Siam, runs southward through the Federated Malay States and the Straits Settlements, and disappears under the sea to emerge in the Dutch islands beyond. This is where the tin cans start unless, indeed, they come, as of recent years some may do, from the Andes Mountains, 15,000 feet above sea

[1] Cf. *Year Book*, 1924, American Bureau of Metal Statistics, p. 96.
[2] Cf. *ibid.*, p. 97, and *Commerce Reports*, United States Department of Commerce, August 3, 1925.

level in Bolivia. All tinware of every kind is an international product. Starting from far Asia or from tropic snows in South America, the tin comes to this continent, but before we can put it to use we call on Africa for help. We need palm oil which we get from British West Africa and the Belgian Kongo direct or through Europe. We took over 101,750,000 pounds of it in 1924. For the process of making tinplate in America is to dip thin sheets of our steel into a blend of African palm oil and then into Asiatic or Bolivian melted tin, and so we get what we popularly call tin — a sheet of steel plated with tin. What home is there without tinware? Who is there that does not use tin cans or boxes for the foods and other products that come in them? Shall we look on these humble containers with more respect when we consider how far the materials in them have come to our service? The salts of tin are used as mordants in dyeing and calico printing and for weighting silks, and tin also finds use in ceramic enamels. Chlorides of tin are so important for use in textiles that factories have grown up for de-tinning scrap tin for this special use.

There are rumors of tin supply to come from the edge of the Arctic Ocean in Alaska, but as yet, says an official statement, 'no developments . . . justify any hope that the United States will eventually

become independent of foreign sources of supply.'[1] Yet we require tin not only for the purposes named, but for bronzes, solder, collapsible tubes, babbitt and other metal for bearings, type and brittania metals,[2] tin foil and pewter; pipes of block tin are in soda fountains and chemical laboratories. The oxide is used in making white enamel for bathtubs and basins. Every person, young or old, in the United States requires tin in some form, but few think of the laborers in far Malaya or in the Dutch islands or among the Andes to whom we owe what seems so common a thing. How many reflect upon the fact that the control of so essential a supply is not in American hands?

Everybody drops nickels in the slot in these subway days thoughtless of any international relation in connection with our familiar coin with the buffalo and the Indian, stamped 'Liberty' and 'E Pluribus Unum.' Why mention it? Merely to say that, unlike the buffalo and the Indian, it is alien to our soil. That five-cent nickel — so far as it *is* nickel — is a Canadian. Nickel was left out of our physical constitution. Such ore bodies as we have are low grade, scattered and unimportant relative to those of Canada.[3] We are the greatest

[1] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Tin,' revised edition, 1922, pp. 7–8, 13.

[2] Cf. *A List of Alloys*, American Society for Testing Materials, 1922, p. 21.

[3] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Nickel,' revised edition, 1921, p. 7.

producer of refined nickel, but we do not mine the ore. Our small domestic supply comes as a by-product in the electrolytic refining of copper in which way we obtain a few hundred tons [1] of native nickel annually. In 1923 we imported 20,400 tons; in 1924, 18,500 tons of nickel in all forms.

Everybody uses nickel, but the use best known —for coins—is the least important. The largest consumption is in steel,[2] say, 42.5 per cent of all nickel in a time of peace like 1923. In war-time it is more — perhaps three fourths of all. About one quarter goes into nickel silver. Some 17 per cent is used in electro-plating, and we all know what nickel-plate means so well that we call a railway by that name. About 11 per cent is taken for special alloys and 7 per cent for miscellaneous uses— that's where the subway nickel is. That coin is about three fourths copper with one per cent of manganese.

This Canadian metal enters intimately into our life. In one form it is combined with chromium, which is the metal we get from Rhodesia, and other distant places to make electric heating elements for annealing, baking, casting, melting, and other heat-using processes.

[1] Cf. *Mineral Resources of the United States in 1922*, United States Geological Survey, Department of the Interior, 1925, article 'Nickel,' Frank L. Hess, p. 563.

[2] Cf. *ibid.*, p. 564.

Nickel steel is in ordnance, armor plate, bridges, rails, shafting, axles, in the equipment of sugar mills and glass works, in chemical equipment, in paper machinery, electrical instruments, in parts for refrigeration plants and those making food products. It is, indeed, in almost universal service, and nowhere is more useful than in automobiles. There it hides helpfully in steering knuckles and gears, crank shafts and connecting rods, and aids to make the transmission responsible. A list of the various alloys in which it is combined covers five closely printed pages. Finally, as Monel Metal [1] it is used in oil refineries, salt works, laundries, dairies, hotels and cafeterias, dining-cars, hospitals, ice-cream plants and soda fountains. Truly of universal application. Both mining and refining, as well as the later manufacture, are largely under the control of American capital. Nevertheless, the origin of this necessary metal lies outside our jurisdiction. It is but one of several products which Canada supplies that bind her to us by the need of our great market and us to her by our equal need of supplies.

Tungsten (a combination of two Swedish words meaning heavy stone) is a metal that has sprung into use within recent years, though its existence

[1] Cf. *A List of Alloys*, American Society for Testing Materials, 1922, p. 12.

has been recognized for over a century. It is distributed widely over the earth and we have a share, though a small one, in our Southwestern States. The statistics relating to tungsten are confused, but during the period which includes the war we produced from 12 to 25 per cent of the world's supply of ore, our output rising to its height of 6144 tons in 1917 under war pressure. In that year the world production was 28,308 tons. It rose the following year to 40,688 tons, but our share fell to 5061 tons (12.46 per cent of all). With the close of the war our product fell away rapidly to 327 tons in 1919 and in 1921 and 1922 there is no record of a domestic output. It appears as 374 tons in 1924.[1] The Tariff Commission's report states that tungsten is an essential war metal the use of which in steel cutters for machine tools results in a five-fold increase of output. It adds that 90 to 95 per cent of the tungsten produced goes into tool steel, that 'the tungsten industry is pivotal,' and that all metal manufacturing industries are largely dependent upon it. The use of

[1] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Tungsten Ores,' revised edition, 1921, p. 45 *et seq.*; also *ibid.*, 'Tungsten Metal and Ferrotungsten,' p. 109 *et seq.* Also 'Rare Metals in 1923,' Frank L. Hess, being a portion of Part I of *Mineral Resources of the United States*, 1923, November 29, 1924, pp. 242–45. Also *Mineral Resources of the United States in 1924*, United States Geological Survey, Department of the Interior, August 10, 1925, p. 80A.

tungsten in electric lamps is well known. We are one of the largest consumers of the metal in the world. Our ores are low grade; the easily obtained ore has been exhausted and mining progresses only at a few favored places. The ores of China have dominated the market because of superior resources and low-priced labor. It remains to be seen what readjustments in this and other important respects — as with China wood oil — may arise from disturbed conditions in the so-called Chinese Republic. Our importations of tungsten are many times our own production. In 1920, the last year for which comparable figures are available, our product was 216 short tons, our imports 1949 short tons. A statement of the world's supply for six years, 1913–18 inclusive, shows Burma (including the Shan States), China, Korea, Portugal, Spain, Bolivia, and the United States as the leading producers.[1]

Vanadium, named from the Norse goddess, Vanadis, is a recent addition to the repertoire of metals. We look for it to the Peruvian Andes at an altitude of 16,200 feet in a barren land more than two hundred miles back from the Pacific. There the Vanadium Corporation of America operates

[1] Cf. *Tariff Information Surveys, supra,* pp. 56–57; also *Tariff Information Surveys,* United States Tariff Commission, 'The Ferroalloy Industries, Tungsten Metal and Ferrotungsten,' revised edition, 1921, pp. 109–22 inclusive.

mines whence the ore is brought to the company's smelter near Pittsburgh.[1]

As recently as 1892 vanadium was a rare element and was valued at $4792 a pound, fifteen times more than gold. Two brothers, J. J. and J. M. Flannery, had faith that this little known material might be used advantageously by steelmakers. The story of their search of the world for a sufficient supply is one of the romances of commerce. They found it at last in the high Andes and from there the world's supply comes to-day. Small deposits of vanadium minerals exist in America, but the ores are low grade and costly to work and the company which controls them produces the metal more cheaply from its Peruvian mines.

The year 1925 is the centenary of the steam railway engine and coincides with a great increase in the power, scope, and economy of the locomotive. We hear of three-cylinder engines, of auxiliary power units, of feed water heaters, superheaters, and other applications of engineering and mechanical science. Quite as important and, indeed, making many improvements possible has been the work of the metallurgical chemist in producing steel alloys. The major driving parts of the locomotive, such as main rods, side rods,

[1] Cf. *Vanadium Steels*, American Vanadium Company, Pittsburgh, Pennsylvania, 1912; also Bulletin 175, Mining and Metallurgical Society of America, New York, vol. XVIII, no. 3, April–May, 1925.

piston rods, and crosshead pins, are made from steel in which vanadium, with other metals, is used as an alloy. It is in crank-axles, in crank-pins and cylinders and in the main engine frame itself, for carbon-vanadium steel has one half more useful strength than ordinary carbon steel and equally high resistance to fatigue and shock. It combines with chromium and nickel in armor-piercing shells and in armor for decks and gun-shields. As this is written, literally thousands, indeed millions of lives are unconsciously depending on it, for by itself and in combination it goes into the steering knuckles, shafts, and other members of automobiles, and makes the lightness of those parts at once possible and safe.[1]

Look at such a locomotive as has recently made a round trip, pulling a heavy fast express, between St. Paul and Seattle. Whence came that engine, so mighty yet so easily controlled? Where was it born? In the minds of trained American designers and draftsmen? At the hands of skilled American moulders, smiths, and mechanics? Yes, but that is not all. With the help, you add, of chemists, steel-workers, and furnace-men. Yes, and something more. The great locomotive stands there through the sweat of toilers in the Caucasus

[1] Cf. *Vanadium (The Master Alloy) in War and Peace*, Vanadium Corporation of America, New York.

far over the sea, or in the heats of India or Brazil, through the labor of miners in distant Rhodesia or in New Caledonia in the South Pacific, through the aid of Canadian workers in nickel mines, through the help of Peruvian Indians extracting vanadium ore. These supplied for that locomotive what America lacked; their labors far off have united with our efforts at home. Manganese and chrome, nickel and vanadium have met in the steel fabric of our locomotive. Tools of steel alloyed with Chinese tungsten were used to fit them to service. Thus was the monster born, the product of the continents.

This is the mineral-using age.[1] The metallurgical chemist and the mining engineer have in the last twenty years altered the face of the earth. The possession by a nation of abundant iron ores and ample coal and lime are no longer sufficient. Nor does any one nation, however great, control within its borders enough of what are now necessary mineral supplies to stand alone.

American capital controls, equips, and manages the copper mines of Chile, Peru, Mexico, and British Columbia. American capital controls manganese in the Caucasus, chrome in New Caledonia,

[1] Cf. 'The Political Control of Mineral Resources,' C. K. Leith, Professor of Geology, University of Wisconsin, in *Foreign Affairs*, July, 1925, p. 541 *et seq.* Also 'Copper,' James R. Finlay, *Foreign Affairs*, October, 1925, p. 123 *et seq.*

nickel in Canada, vanadium in Peru, and is interested in zinc on the Polish-German boundary. Physically these great sources of our needed supplies lie in foreign jurisdictions: financially they are our own. We have by these investments given hostages to fortune and it is well that it is so. But by no dream and by no refusal to see can we conceal the fact that the interests, political and economic, of the country whence the capital came and of those nations into which it goes are united and not separate.

CHAPTER IV

THE WORLD IN LEATHER

It is reported that a currier of olden time who was asked to advise about fortifying his city, said, 'There's nothing, sir, like leather,' and a glance at the records of history will justify his statement. Beggars and bankers, priests and potentates, cowboys and coryphées, pirates and politicians, in both past and present have this in common that all have been shod with leather. The purses and wallets of both rich and poor, the martyr's scourge, the huntsman's saddle, the aviator's coat, the helmet of the football hero, the catcher's mitt, the glove on my lady's hand — all these and many more depend on leather. It is used for driving machinery and for powdering noses, for the moccasin of the savage and the slipper of the danseuse. It was well said, 'Leather is such a natural thing that man accepts it, uses it, forgets it, yet could scarcely get along without it.'[1]

The production of leather is both fundamental and modern. It was known to ancient China and to prehistoric Egypt; it has renewed its youth and is applying the latest results of chemical science

[1] Cf. *The Story of Leather*, published by the Eagle-Ottawa Leather Company, Grand Haven, Michigan, p. 11.

to its processes. There is technical basis for the confidence expressed by the Tanners' Council of the U.S.A. that 'no other country can approach ours in the making of leather and it is safe to say that no other country ever will.'

The thought of our leather supply brings before the mind a vision of the animals whose skins we use. They form a moving picture of a long, sad procession, far and near. From one point of view the story of leather is that of slaughter grim and great. Horses and colts, buffaloes, elk, and deer are associated in the sacrifice, cattle and calves, goats and kids, pigs, sheep, wallabys and kangaroos, walrus and seals, asses and rabbits.[1] The skins they have surrendered are constantly coming to us from the strange and distant places of the earth, many, indeed, from home, more from abroad. For our situation as concerns the raw material for leather is unlike that which exists with rubber and jute. We do produce many of the hides we require, millions of them, but not enough. Our position is better than with the important alloy metals, for our supply, so far as it goes, is good even if it fails to make us independent. On the other hand, the hides and skins that we import come to us, not from a few countries, but from many. The full list reads like a catalogue of the

[1] Skins sent as furs are not included in this chapter.

nations, even of their subdivisions. It is as if we had to comb the remote areas of the globe to get enough, and that is the very truth. The shoes and gloves, belts, bags, and portfolios of a coming year are now wandering actively about Australia and Asia Minor, India and Argentina, China and South Africa, and pretty much everywhere else, our own broad plains included. This matter of leather is cosmopolitan and broadly zoölogical, reaching even to the sharks of the ocean, the porpoise, the whale, and the amphibious alligator. So much for the raw material.

It is much the same with the materials for tanning. We have some, but not sufficient, and there are gaps in the native supply as there are with hides and skins. So we meet the necessities of our tanners by requisition on Europe, Asia, Africa, Australia, and South America, and sometimes on several countries in each. To get the true picture of leather as it is made, we must visualize tides of animal skins — millions of skins — flowing to us from all quarters of the compass, paralleled by another current of the tanning materials which we require to permit us to use the hides and skins, domestic as well as foreign. The picture will be complete if we can see also the export movement of shoes, leather, and other articles made from it which spreads outward from our ports.

Any close observation of our larger trade operations will indicate that we are passing from the status of a producing nation into that of a converting one. The process shows clearly in rubber. It appears in varying degree in some products of jute, in products of steel alloys, in newsprint paper, and very plainly in certain kinds of leather. We are entering the industrial stage where we import some or all of our materials (sometimes already partly manufactured), convert them into the finished goods, and consume or export them. Great Britain has been the great converting nation and many have been the comments on the economic problems so created for her statesmen and legislators. The dawn of a like day is upon us and brings with it the necessity for readjusting our outlook overseas.

Let us examine in more detail our own situation as respects hides and skins,[1] and materials for turning same into useful leather. Then, of course, there is artificial leather which never saw an animal, but is a subject of the vegetable kingdom.

The United States is the foremost leather-making, using, and exporting nation in the world,

[1] The word 'hides' usually means the pelts of cattle, horses, and buffaloes; the word 'skins' is applied to those of calves, sheep, lambs, goats, kids, and all smaller animals. It is the business custom, however, to treat pelts weighing less than twenty-five pounds as skins, and those over that weight as hides.

and is still an important source of hides and skins, although this must be said with marked qualifications and with the fact in mind that our production falls far short of domestic manufacturing requirements.[1] In the face of what appears to be a growing demand for leather, the number of cattle in the United States has been declining. A more pronounced reduction appears to be taking place in the numbers of sheep throughout the world.

In the year 1924 there was a supply of 15,780,000 calf skins in the United States, of which 40 per cent were imported. The supply of cattle hides was 16,343,000 (18 per cent imported), of goat skins 30,175,000 (less than half of one per cent domestic), sheep skins 38,525,000 (60 per cent imported), and horse hides 428,000, substantially all imported. As a whole, the supply was over 101,000,000 pelts, of which 62 per cent were imported, and that was a small import year.[2] The average for

[1] Cf. *Hides and Skins*, Tariff Information Series 28, United States Tariff Commission, 1922, pp. 1–3.

[2] Cf. Special Circular 428, Hide and Leather Division, Bureau of Foreign and Domestic Commerce, United States Department of Commerce, April 24, 1925.

This means that in a time when trade was comparatively dull animals in foreign lands were continuously killed at the average rate of over 172,000 every day in the year simply to meet those of our demands for leather which we could not supply ourselves. This does not include animals killed for hat fur which would more than double the number nor does it cover pelts taken for dress furs. It is within the facts to say that a half million animals are slain every day outside our borders to supply our demands.

thirteen years was 36 per cent of imported cattle hides, and of calf skins 52 per cent. In general, it is correct to say that we get from abroad half our calf skins, over one third our hides, all our goat skins, and nearly two thirds of our sheep skins. They come, as the Tariff Commission says, 'from all corners of the world.' From the one port of Karachi in India we took in a single recent year nearly six million raw skins and the movement seems to be enlarging. Our receipts of hides and skins from other countries in the first nine months of 1925 were 144,662 net tons in weight and $77,581,000 in value, an increase of 12.4 per cent of weight and 42.2 per cent of value over the same period of the year before.

In speaking of the sources whence we draw hides and skins the remote places and corners of the earth have been mentioned. Let us look briefly into those sources, using the official records for July, 1925, as our guide. In that one month we drew hides from twenty-seven countries, calf skins from twenty-two countries, sheep and lamb skins from twenty-nine, goat and kid skins from thirty-one, and 'other hides and skins' from twenty-four. In all, sixty countries sent us some kinds of animal pelts in that one month. This was not an unusual import. March of the same year was much larger. In that July the largest lot of hides came from

Argentina, as is common, with Canada second; British India sent 12,900 buffalo hides, Canada furnished 134,000 calf skins, with Latvia second and Sweden a runner-up. Argentina was first on horse hides, with 16,899, and Great Britain second. New Zealand took the prize for sheep skins, with 697,895, Great Britain again second, sending 358,224. China led on goat skins, furnishing over a million, with British India second, with 797,000, and Aden third, 305,467, and finally Norway was at the top of the miscellaneous, with 355,914 skins. These were the chief shippers, but Uruguay was in the list and Algeria, Haiti, Barbados, Java, Hejaz, Tunis, Morocco, Poland, Finland, Esthonia, and there were others.

British India is 'the largest producing market of hides and skins in the world.'[1] Official records show that over twenty million goat skins were shipped from Calcutta alone in 1919. Australia is the sole source for kangaroo and wallaby skins. Mocha coffee from Aden is matched by Mocha skins sent us from both the Arabian and African sides of the Red Sea accompanied by others from Abyssinia. The United States is no respecter of

[1] Cf. 'Sources of Foreign Hides and Skins,' address of Mr. Max J. H. Rossbach, President National Association of Importers of Hides and Skins, before the general meeting of the Tanners' Council, Atlantic City, May 7, 1920. Published by Tanners' Council of the U.S.A., New York, 1920, p. 11.

persons in seeking for hides and cares not for race or color when it requires skins. We take them from Uganda and Zanzibar, Nigeria and Madagascar, and welcome them all.

Broadly speaking, there are two distinct branches of the tanning industry — the making of sole and heavy leathers and of light leathers. Hides make heavy leathers, about three quarters of which go into the soles of boots and shoes, the rest into belting and harness, saddlery, cases, and heavy bags. Thin, broad hides find their way into upholstery leather. Light leathers made from skins go chiefly into shoe uppers, and the balance find service in gloves, purses, bookbinding, hatbands, and fancy articles of a thousand kinds. Hides are often split to make certain grades of light leathers. No one escapes the use of leather. It must all be tanned and we now turn to inquire about the materials used for that purpose.

If, as a competent authority states, 'The collecting of hides for our tanneries is a study in geography,'[1] the gathering of tanning materials is little less so. It is not surprising that with the facts before him a leading banker spoke of a shoe as an international product. Indeed, from the standpoint of the origins of materials used, it would be as hard to find a strictly American pair of shoes as

[1] Tanners' Council of the U.S.A.

a tin can. If the nations were as united in spirit as they are in leather there would be little fear of wars. A pair of boots is a league of nations.

Whether or not it is true that trade follows the flag, it has certainly been the case that tanneries have followed the bark. Where the oaks were, thither the tanners went; where hemlocks grew, the tanners followed. To others the chestnut wood made a like appeal. Hence tanneries grew up in Pennsylvania and its southern neighbors, following the oaks, and in New York, Michigan, and Wisconsin, the homes of hemlocks. In our Southern States the chestnut found its followers. This *was* the case rather than *is* the case. Tanneries remain where the bark and wood invited them to come, but neither wood nor bark remains sufficient for them. Many Northern country boys will recall the loads of tanbark passing to the local tanner or the railway station. That day is gone, and the tanner, wherever he is, draws supplies from afar. Two years ago the yards of a great Pennsylvania tannery were filled with long piles of bark looking very impressive, but a question as to its sufficiency brought answer that the plant had to use large quantities of imported extract.

We have stepped from the animal kingdom over into the vegetable world. Our concern now is with trees, plants, and their fruits. There is a great ex-

ception, one that takes us into the mineral kingdom where we shall meet again a material that is now familiar to us, namely, chromium.

Few illusions exist among tanners respecting our self-sufficiency in tanning materials. No one knows better than they the tragic meaning of the chestnut blight, or understands more clearly that reproduction of hemlock and oak has not kept pace with the deforesting demands arising in part from the development of our tanneries. Nor does Washington hold exuberant delusions on a subject so vital to a great industry and through it to every American. The application of science to their processes by our tanners is not more marked than their vision in reaching out to all lands where there is promise of an adequate supply of materials to make good our domestic shortage. Under Congressional direction to study the situation respecting essential raw materials, a preliminary survey has been made into the sources of tanning supplies and several bulletins have appeared.[1] The title of the first is significant, 'The Problem of Our Commercial Independence in Tanning Materials.'

A leader among the world's tanning supplies is quebracho wood. Both the name and the wood

[1] Cf. *Tanning Materials Survey*, Trade Information Bulletins 167, January 2, 1924; 211, March 17, 1924; 295, December, 1924. Bureau of Foreign and Domestic Commerce, United States Department of Commerce.

are interesting. Quebracho means axe-breaker. It fairly indicates the nature of the wood, which is one of the hardest and heaviest known, almost like a vegetable iron. It will not float, for it is a third heavier than water, weighing about eighty pounds to the cubic foot. It turns the edge of hard steel tools and breaks the teeth of circular saws. Special machinery has been devised to make it available. The wood is so durable that railway ties made from it are sound at the end of forty years. It is also excellent for cabinet-making, but the large amount of tannin in the heartwood (not the bark) gives it supreme value to the leather-maker to whom it comes as solid or liquid extract. It has been known to commerce only since 1878. The first extract was made in this country in 1897, but its use, though developed slowly, has grown to large proportions. We imported over 28,000 tons of the solid extract in the first six months of 1925 and under normal conditions annually take 50,000 tons [1] or more, and logs besides (50,000 tons of logs in 1922).

The home of the quebracho tree is in northern Argentina and Paraguay and all our supply comes from there. We use it extensively in sole and sheepskin leathers, in harness and belting, in patent and automobile and other leathers, as a blend with our

[1] Cf. 'Quebracho,' *Tanning Materials Survey*, Bulletin 295, *supra*.

native materials. We do not and cannot produce quebracho: we are its largest user, we are wholly dependent for it on foreign sources, and most of us quite unconsciously have it on our feet. It forms about one third of all the vegetable tannins that we use.[1]

It sounds strange to American ears to speak of wattle plantations. There are such, but not among us. We find them in Natal to the extent of over 310,000 acres, for there wattle (mimosa) has been grown for forty years and is now thought the most important forest product of the Union of South Africa. Indigenous in Australia this species of acacia has been found so peculiarly adapted to the soil, climate, and labor conditions of South Africa that the Australian tanneries are now supplied from Natal and wattle is a mainstay of Natal's progress.[2] We consumed over 6000 net tons in 1924 (a poor year) and 10,000 tons in 1922. Our Government suggests 'for the earnest consideration of the leather industry of the United States' that the supply of wattle bark is commercially produced only under British control, that the tree can be successfully cultivated in the southern

[1] Cf. interesting illustrated article by R. O. Phillips, Chief Chemist, The Tannin Corporation, *Chemical and Metallurgical Engineering*, July, 1925, p. 611.

[2] Cf. 'Wattle Culture,' *Tanning Materials Survey*, Bulletin 211, *supra*.

United States and adjacent countries, and that, while a rapid grower, it has in the bark three times as much tannin content as the slower-growing hemlock and oak.[1]

Mangrove bark comes from Madagascar and East Africa. There is a considerable native supply in southwestern Florida, but the cost of labor and freight have been less from Africa. In Borneo there is a natural monopoly in the production of an extract of mangrove bark called 'Borneo cutch.' In January of 1924 an official Government report pointed out that at the present rate of our use of mangrove there was enough in Florida to meet the demands of the next twenty-five years. It proceeds:

> Owing to the serious depletion of our other natural resources of tanning materials, namely, the approaching elimination of oak and hemlock barks and the serious devastation which the blight is causing in our chestnut forests, it is imperative that we face the situation frankly and consider how we may prevent the rapid development of serious dependence on foreign tanning materials within the next fifteen years.[2]

We shall have occasion later to consider our forest problem in relation to our supply of paper-making materials, but it is well to pause briefly at

[1] Cf. 'Wattle Culture,' *Tanning Materials Survey,* Bulletin 211, *supra,* p. 21.

[2] Cf. *Tanning Materials Survey,* Bulletin 167, *supra,* p. 8.

this point to recall that the drain upon our forest resources comes from many directions and the demands are certain to increase as the country grows. We are apt to say severe things of spendthrifts, such as, for example, that 'a fool and his money are soon parted.' Unless there can be a greater infusion of the plainest common sense into the arteries of our body politic on this subject of forestry, we shall surely come to deserve an equally severe comment upon our national folly. Fix attention on these words used in the above quotation, 'depletion,' 'elimination,' 'devastation,' 'dependence,' and remember that these were not used in the flow of oratory or the rush of argument, but are part of a thoughtful statement which is the result of thorough study by trained men.

We have a domestic resource in sumac, and we avail ourselves of it. Our harvest comes from a group of States in our Central East reaching from Pennsylvania to North Carolina. The product is good as far as it goes, but there is not enough and we are obliged to turn to Italy in order to get this leaf in sufficient quantity to meet our needs. We brought 6900 tons from Sicily in 1923, and 4900 tons the following year. It is valuable for tanning sheepskins and we are the largest users.

After bark and leaves and wood we find it necessary to turn to foreign fruits and seeds and three

of our principal tanning materials are such, divi-divi, valonia, and myrobalans. They have the advantage of being gathered from annual crops without causing depletion of forests. Divi-divi is the native name for a dried seed-pod that comes chiefly from Venezuela. We 'entered for consumption' over 4,400,000 pounds in 1924. Valonia[1] is an acorn-cup from tall, evergreen oaks native to Asia Minor and Greece which is gathered by peasant men, women, and children, the entire family participating in collecting the acorns and loading them in sacks on donkeys and camels for transportation. We received over 8300 net tons in 1924, chiefly from Turkey in Europe and Turkey in Asia and Greece. Myrobalans are the dried, unripe fruits (nuts) of a tree indigenous to Southern and Central India and the industry is said to be controlled by one large Indian house. The stands of the tree both wild and cultivated are extensive and the supply of the nuts seems inexhaustible. India sent us 27,000 tons in 1923. Gambier is a tanning material which our Government classes among gums and resins. It is the solid extract from the leaves, shoots, and twigs of a shrub native to the East Indies and Southeastern Asia. We imported

[1] Cf. *The Valonia Industry in Turkey*, Special Circular 514, Hide and Leather Division, Bureau of Foreign and Domestic Commerce, United States Department of Commerce, July 28, 1925.

over six million pounds in 1923 through the port of Singapore.

In summing up the domestic and foreign vegetable tanning extracts used in the United States during 1922 our official report[1] states the consumption in bark tons (based on 12 per cent of tannin) thus:

Domestic extracts of all kinds.....	382,322
Foreign extracts of all kinds.....	350,517

Of these combined, liquid and solid quebracho extract taken together forms the largest item. The report adds, 'For the next decade we are apparently in a position to be independent of foreign sources of supply in the event of a national emergency,' emphasizing, however, that 'our present and future security rests absolutely upon sound forestry practice.' It urges not only that black wattle be cultivated 'in those sections of the United States best suited to its growth,' but that a study be made of the possibilities of wattle culture 'in foreign territory contiguous to the United States.' Pointing out that an acre of wattle trees after seven years of growth contains the same quantity of tanning units as eighteen acres of oak

[1] Cf. *Tanning Materials Survey*, Bulletin 167, *supra*, pp. 14–17, and also Bulletin 211, p. 22. These give an interesting series of comparative tables of production and consumption of vegetable tanning materials.

trees from forty to fifty years old, it states that wattle and sumac may be cultivated in this country on such a scale, if the proper quality of sumac can be developed on our soil, as ultimately with our existing natural resources to make us independent of every foreign raw tanning material of importance. The existing situation from our domestic point of view does not give the smallest encouragement for the advocate of our self-sufficiency.

It remains but to speak briefly of the use of our acquaintance, chromium, in tanning. Chrome tannage is an American invention, though now of general use. It became established between 1895 and 1900 and has revolutionized the leather industry as respects shoe uppers, glove leather, and other soft and fancy leathers. In it chromium salts are used instead of the vegetable tannins. Kid leather is almost wholly produced by chrome tanning, and it is applied in some measure to sole leathers, and, mixed with oak bark, to some belt leathers.[1]

Truly, the story of leather is a cosmopolitan one.

[1] Cf. *Nothing Takes the Place of Leather*, American Sole and Belting Leather Tanners, Inc., New York, 1924. Also, *The Story of Leather*, by Allen Rogers, Ph.D., for the Ohio Leather Company, Girard, Ohio, 1923. An interesting comparative study of the wearing qualities of chrome and vegetable tanned leathers is found in Technologic Paper 286, Bureau of Standards, United States Department of Commerce, June 13, 1925.

Every continent contributes its part as well as the islands of the sea. Men of every race, color, and social condition are involved in it. The lines of national interaction run out from America as do the radio waves and few countries fail of contact with them. A pair of shoes is a simple thing, so one may thoughtlessly say; but back of them lie vision and science and executive energy on our part and the willing, continuous contribution of labor and materials on the part of men in almost every nation under heaven.

Clearly, whatever our concern may be with the affairs of men in other countries we have a substantial interest in their animals and plants. The peasant families gathering valonia in Asia Minor and Greece are in our service. So are Italians sending sumac through Palermo, and the natives of Natal shipping wattle from Durban. Indian nut-harvesters in the hinterland of Madras and those collecting pods in Venezuela and bark in Madagascar are fellow workers with the tannery employees of Pennsylvania. It is a common task, a mutual labor, save when it is ruptured to the hurt of all by the brutal hand of war.

CHAPTER V

FAMILY SUPPLIES

A VOICE speaks from somewhere in New England, saying: 'I can go without my coffee, if necessary: let us depend on ourselves for our supplies.'

So far as this utterance may mean that we ought to develop our own resources to the full, every one will say, 'Amen.' But if, as seems probable, the remark expressed faith in the safety or even the comfort of our entire self-dependence, we must dissent with vigor and variety. It seems almost incredible in this day that such a statement could be made — so sincere and so ignorant. It shows the attitude that has led some students to doubt whether democracies can continuously manage their foreign affairs wisely. The speaker meant to express confidence in his country; instead he betrayed ignorance of that country. Were we to depend on ourselves alone for supplies, more than coffee would have to be surrendered, so much more, indeed, that life would turn backward in its course. Kipling, in his 'Letting in the Jungle,' has drawn a vivid picture of results like those which would inevitably follow a continued attempt at full self-dependence on the part of any modern nation. We tried it once in Jefferson's Embargo of 1807

which a modern historian reminds us was called 'a successful means of bringing an era of American prosperity to an abrupt end.'[1] The voice we heard from New England spoke from the tomb of a dead past that can never return while civilization endures.

For the time, however, we may take the speaker seriously enough to inquire what would be some of the results to him and his family were his wish granted. As in an earlier chapter the origin of shoes has been considered, let us now go to the other end of the matter and ask this passionate patriot where he got his hat. To treat the subject broadly we will examine his winter and summer hats and his wife's as well, and then pass to some of their personal belongings and their food.

Where did those hats begin? It will not suffice to refer to the retail hatter or even to the manufacturer whose name adorns them; we must go back of them to fields and streams. The felt hats were made from the fur of rabbits, hares, or conies, with some 'nutria,' muskrat, and beaver. Uncle Sam himself says, 'The fur of the domestic rabbit is unsuitable for fur felt hats.'[2] Despite a laudable attempt to use for hats the fur of our 'cottontail' most of the materials must be imported, and a

[1] Cf. *History of the American Frontier, 1763–1893*, by Frederic L. Paxson, Professor of History, University of Wisconsin, 1924, p. 188.

[2] Cf. *Dictionary of Tariff Information*, United States Tariff Commission, 1924, p. 359.

leading manufacturer states that the industry is 'absolutely dependent' on foreign supplies. It is just here that our friend whose family felt hats we are discussing comes into touch with the Australian and New Zealand rabbit problem, for apparently quite unknown to himself he is aiding to rid those friendly countries of the surplus rabbits which have long been a serious nuisance. Should his hat be made of coney or hare's fur he must look to Europe for its birth. Possibly the felt of his hat is made from 'nutria.' If so, he will find its origin in the Amazon River and in the so-called South American beaver whose true name is coypu.

Australia has so many billions of rabbits that the trifle of 31,300,000 rabbit skins she sent us in 1924 made no serious inroad on her supply. She would have been glad had the number been doubled. New Zealand added about 10,000,000 more, and was pleased to be rid of them. Eighty-eight tons of rabbit skins from the Antipodes were offered in New York on an autumn morning in 1925 and plenty remain at home. We do not think of such thickly inhabited industrial countries as Belgium and England as sources of raw materials, but Belgium sent us during 1924 over 22,300,000 skins of hat fur and England over 19,400,000. Serious floods in England in the spring of 1924 caused a notable shrinkage in the supply of hat fur from

that country and were reflected in advanced prices here the next year. Over 96,600,000 hat fur skins came to us in 1924 from thirty-four countries plus nearly 300,000 pounds of hatters' cut fur, mostly from France, so that the hats of our friend's family were probably broadly international in their origin. Even the better grades of caps are of imported fabrics.

Strange as it seems to have the skins of more than 96,600,000 dead rabbits, hares, and conies descend upon American heads each year, the facts respecting the materials for light hats are as striking. The hat of straw, chip, or grass is predominantly Asiatic. The materials come in long braids or plaits and the mileage of them is immense. The word mileage is used advisedly. From Japan and China together in 1924 we received almost exactly a billion yards; Switzerland contributed nearly 150,000,000 yards and Italy almost 70,000,000. In all we took from fifteen countries 1,281,000,000 yards, which is more than *725,000 miles* of hat braids. Save for a limited quantity of fancy types made from various fibers, no braids are produced in this country. In sewing the braids together in the manufacture of straw hats, thread of Egyptian cotton is used. The sweatbands of felt and straw hats are made from fine sheepskin and the net lining in straw hats is brought from

Europe. For finished hat bodies we look chiefly to Italy, but also to South America, the Philippines, Porto Rico, China, Java, Japan, England, Switzerland, France, and Germany. Millions of so-called harvest hats come from Java, China, Mexico, and the Dutch West Indies. The straw hat is quite as much a world citizen as his fellow of felt.[1] Our New England friend would look in vain to any sufficient source in the United States for hats for the American people.

So far as our fellow citizen and his family use linen in clothing, handkerchiefs, napkins, and towels (other than crash), their chief source of supply is Ireland. The domestic production of linen goods is of crash, the coarser grades of huck toweling, glass toweling, thread and twine, and a limited amount of paddings for tailors. Even our spinners of domestic linen use imported fiber in making the yarns they use for weaving, for our production of flax fiber is small and our spinners have not found it satisfactory. The larger part of our linen imports are of materials not manufactured in the United States. Our country is the largest user of linen fabrics, but depends upon imports for its requirements.[2]

[1] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Straw Hats,' revised edition, 1921, pp. 8, 13–18.

[2] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Woven Fabrics of Flax,' 1923, pp. 1–13.

The neckties our friend wears, if of real 'worm' silk, and the silks in feminine service in the household, are of Japanese origin. Hidden in the collar and shoulders of his coat is tailors' padding, partly or wholly of jute from India. The coat itself and vest and trousers contain a substantial amount of Argentine or Australasian wool. The hair nets for wife and daughter come from China — although bobbed hair has hurt the trade. The family toothbrushes are ordinarily Japanese; the island empire sent us more than two millions every month in 1923. France and Germany each contributed over a million in that year. The other toilet brushes about the house may have been either Asiatic or domestic, but any paint-brushes or hair pencils among them are possibly German. Even if the brushes are of domestic manufacture, and many of them are, for we have several hundred factories at work, the bristles in them are foreign and chiefly Chinese.[1]

[1] In 1923 we imported 6,563,003 pounds of bristles, of which 4,306,785 pounds came from China, 1,190,926 pounds from England, 455,361 pounds from Germany. In 1924 we imported 4,678,275 pounds of bristles, of which 3,344,429 pounds came from China, and 822,431 pounds from Great Britain. Those from Great Britain include re-exports and the German figure may include some bristles from Russian sources.

We imported in 1923, 33,725,899 toothbrushes, of which 30,602,640 came from Japan, 1,528,187 from France, and 1,307,959 from Germany. Of all other brushes that year we imported a total of 45,892,287 of which 23,594,698 came from Japan and 16,838,682 from Germany, including 5,416,458 paint-brushes. The importations for 1924 were smaller in total number, but of approximately similar distribution.

It is an interesting speculation to think what would happen to our fellow citizen if each element of his personal clothing and of the articles commonly used by him at home were given a voice and spoke in its native dialect. The result would be such as is written of the Tower of Babel. His hats would talk in several tongues, his shoes would break out in polyglot speech, and his clothing would unite the languages of Europe to that of our own land, all bearing witness to the common interests of men.

Three of the commodities we have mentioned should have further inquiry, wool, bristles and brushes together, and silk. The United States and Great Britain are the two countries which are large producers of wool, large importers of wool, and large manufacturers of materials made from wool. There is a copious literature, official and private, relating to wool growing and manufacturing in this country and it is not necessary here to go into much detail. The situation in which we stand respecting wool is one that strikingly illustrates our theme. Our share in the world's production is about 11 per cent in quantity and is somewhat less than half of what we ourselves require for our industries, varying from year to year. Certain kinds of wool, however, are nearly or quite absent from our product and these are found at the upper

and lower levels of the list of grades. We do not produce in quantity the finest of wools nor the coarsest varieties.[1] Carpet wool is not a product of the United States. It is strictly correct, therefore, to say that there is no such thing as a carpet which is American in the origin of its materials. Carpet wools are relatively coarse and stiff, lacking the suppleness and felting qualities required for clothing. To some extent they are used in coarse blankets and upholstery materials, or with a mixture of better grades in making rough clothing fabrics, but their main use is in floor coverings. The only supplies of carpet wools that can be called domestic are the trifling amounts grown by our Southwestern Indians and used for their blankets and rugs. The Navajo rug is a strictly domestic creation.[2] Carpet wools come to us from China, India, Persia, and Algeria.[3] The shipments from India represent the product of Afghanistan, Thibet, and other adjacent countries, and the large importations from Great Britain include re-exports. Russia is not a present direct source of supply. We received, however, in the year 1924 substantial

[1] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'The Wool Growing Industry,' 1921, p. 40.

[2] Cf. *Dictionary of Tariff Information*, United States Tariff Commission, 1924, p. 852.

[3] Cf. *International Trade in Wool*, Trade Information Bulletin 301, by Leslie A. Wheeler, Bureau of Foreign and Domestic Commerce, United States Department of Commerce, January, 1925, pp. 1, 24–46.

quantities of carpet wools from thirty different countries to a total amount of 140,960,000 pounds, of which 65,698,000 pounds came from China. Improved wool, usually classified as 'combing' and 'clothing' wool, has come to us since the war chiefly from the following countries in the approximate proportions stated.[1] Argentina, 28 per cent; Australia with New Zealand, 23.7 per cent; Great Britain, 17 per cent; Uruguay, 14 per cent; and British South Africa, 7 per cent. These quantities are variable, and in 1924 Australia sent us direct more wool than Argentina. In the period 1920–21 to 1923–24 inclusive, carpet wool imports have averaged 122,276,000 pounds and improved wool imports 212,202,000 pounds. Australia, Tasmania, and New Zealand together are by far the largest wool-growing countries in the world, supplying almost one third of the total world production and nearly one half of the finer grades of wool.[2] Camels' hair which we use to make filtering fabrics for the extraction of vegetable oils, as well as for textiles, is produced chiefly in Russia and

[1] Cf. *supra*, p. 45.

[2] 'The sheep census gives us about 37,000,000 sheep compared with 79,000,000 for the Australasian district and a figure slightly in excess of our own for Argentina. The world total is estimated at about 573,000,000 and the annual production of wool averages about 3,000,000,000 pounds.' Walter Humphreys, Secretary of the National Association of Wool Manufacturers, and Richard W. Westwood, in *Nature Magazine*, February, 1924, p. 78.

China. Mohair is the hair of the Angora goat, a native of Asia Minor. All women know alpaca, but might not recognize it on the hoof. His South American fellows are the vicuna, llama, and guanaco.[1]

It needs but a glance at the subject of bristles to discover that the American hog is an aristocrat. He is a pork producer high in the porcine social scale above the hog proletariat on whose backs the bristles grow. Because, strange as it may seem, 'the thinner the hog the better the bristle.' The ordinary domestic hog does indeed provide hog hair which is used for upholstery, but the finest varieties of swine are almost hairless. Just as in the plant world we have developed flax away from fiber for linen and toward seed for oil, so in the animal world we have developed the hog for meat and take our bristles from abroad. The result can be put in a phrase: poor pork, good bristles; good pork, poor bristles. We might have plenty of flax fiber if we were willing to go without any domestic supply of linseed oil just as we might have excellent bristles if we were content with almost porkless pigs.

[1] *Commerce Year Book*, United States Department of Commerce, 1924, gives the following comparative table for the years stated, p. 298:

	1914	1922	1923	1924
Wool (1000 pounds):				
U.S. produced.....	290,192	264,560	266,830	282,330
U.S. imported.....	256,501	366,538	388,345	262,655

The hog that bristles, so to speak, is he that dwells in a cold climate. These conditions combine to make the hog of Siberia the best bristles producer, and the finest grades come from the country lying between the Ural Mountains and the Lena River. Political and social overturns have almost cut off this supply, and China is now our chief source, though limited quantities of the best slip out to us from Russia. Bristles, says an official publication, 'are not an American product.' [1] Those re-exported from Great Britain include the output of India.[2]

It seems to be the fact that, useful as bristles are, they are almost or quite an accidental product. Nowhere in the world are hogs either raised for bristles or specially bred to produce them. In those parts of Siberia from which the best grades come, the peasants are so poor that they do not feed the hogs and the bristles grow long and strong. Then, because of their poverty, they not only save the bristles from the hogs that are slaughtered to provide such pork as they have, but also gather in the forests where the hogs range the bristles which the animals shed in the spring. Our own 'razor-backs' provide few bristles. Such limited

[1] Cf. *Tariff Information Surveys,* United States Tariff Commission, 'Bristles and Brushes,' revised edition, 1921, pp. 7–23.

[2] A fine quality of white bristles comes from France in limited volume. Cf. *ibid.,* p. 37.

lots of American bristles as we produce go usually into very cheap brushes, like those used for shoes. We bring red sable hair from Siberia, when we can get it, for fine brushes, and a wide variety of animal hair is used for varnish, shaving, and artists' brushes. Among other supplies of the kind is horsehair from Europe, Asia, and South America to supplement our domestic supply from Texas. Bristles seem to be best produced out of local conditions of poverty, cold, and primitive farming: so much so that if the hogs of all the world should be raised to the American standard, it is possible there would be no sufficient bristle supply. Yet no satisfactory substitute is known.

The United States is the largest consumer of silk, has the largest and best equipped silk manufacturing industry, and produces not a pound of the raw material. More than two thirds comes from Japan[1]—four fifths in 1924; the rest from China and Italy. For the first half of 1925 it was our chief import in value, showing an increase of 19 per cent over the previous year and amounting to more than 8 per cent of all our imports for that period. That means, of course, that the worth of

[1] Cf. *International Trade in Raw Silk*, Trade Information Bulletin 283, Leslie A. Wheeler, Bureau of Foreign and Domestic Commerce, United States Department of Commerce, November, 1924, p. 12; also, *Our World Trade*, January–June, 1925, Foreign Commerce Department, Chamber of Commerce of the United States, p. 11.

the silk imports exceeded those of either sugar, rubber, or coffee. The rapid development of the manufacture of rayon into a great industry has not thus far seriously affected the use of the animal silk. The new material seems rather to have found a place of its own, and we have already become the largest producer and consumer of it.[1] Silk enters more intimately into our industrial life than would seem to be the fact in view of its predominance as a material for clothing and ornament. It plays an important part in electrical industries and in those which function in the field of decorative art and furniture. An interesting use, of which little is known to the general public, is for making cartridge-bag cloth for containing the powder in heavy ordnance. The cloth is entirely of silk which is consumed at the instant of firing, leaving a minimum amount of ash. The powder containers used in guns over three inches in diameter of bore are thus made. At the end of the war the Government had on hand a considerable amount of silk in various forms and it was a perplexing problem to dispose of it.[2] The parachutes used with airplanes are made of imported Japanese silk. Both raise an

[1] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Artificial Silk,' 1925, p. 1.

[2] Cf. *A Study of Silk Waste Used for Cartridge-Bag Cloth, etc.*, Technologic Paper 268, United States Bureau of Standards, December 4, 1924.

interesting question of dependence in a matter of importance to our national defense and the subject is being given careful study by the scientific research staff of the Government. Our importations of raw silk from Japan in 1924 were slightly over 44,300,000 pounds out of total imports that year of a little in excess of 51,250,000 pounds. The movement is expanding. We received, in the first six months of 1925, 27,759,000 pounds, an increase of 7,876,000 pounds over a like period of the year before. A curious sidelight upon the commodity appears in the fact that our manufacturers have not developed intensively the production of silk handkerchiefs in this country. This, says an official report, 'has never been of great importance in the United States.' [1] We imported in 1924 over 52,000 dozen from Japan and nearly 14,000 dozen from Switzerland, and in the first six months of the following year brought in from all sources 319,000 dozen silk handkerchiefs and mufflers, an increase of 157 per cent for the period.

We revert to the American hog to say that in the matter of sausage he goes to great lengths. The poet who sang of 'linked sweetness long drawn out' even in his finest frenzy cannot have projected his imagination as far as our national sausages

[1] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Silk Wearing Apparel, etc.,' revised edition, 1922, pp. 1–3.

extend. At their source the call goes out to the uttermost parts of the earth for the casings wherewith they must be clothed. Think not in the cold winter mornings that the fragrant sausage on your board is wholly the product of some porker native to our soil who has made the final sacrifice that you and yours may be fed. It is that, indeed, but it is more, for those united sausages that came from the neighboring shop are again but part and symbol of an economic league of nations intruding upon your domestic sovereignty, connecting you with internal troubles in many lands, if not in your personal interior department. The lady of the house bought those sausages by the pound, but that unit of measurement is an uncanny device to conceal facts. It would touch realities more closely if she were offered them by the yard, or, perhaps, were one purchasing for a hotel, by the mile. This, be it known, is no illusion and certainly no exaggeration. It is by the miles that sausages come and go, nor are the miles few. No pent-up Utica limits their longitude; no city has so many streets that their aggregate length is comparable to that of our sausage product; no nation has such extensive boundaries that our connected sausages would not surround them. Had Dido used a measure equal to our long-linked lines of sausages she would have circled continents. Not all the rails

on all our roads taken end to end are as long as they. Their length extended would encompass the globe many, yes, many hundred times, and make the moon seem near. It could be the boast of the American sausage that only astronomical distances are comparable to its outreach.

Nonsense, say you? Not at all. 'Tis sober reality, only your eyes have been blinded by that pound device. First of all, then, sausage casings flow to us from all the world — from fifty countries in 1924, from forty-eight the year before — and the reason for their coming is found in these words of the head of a great packing house. There are not, says he, 'sufficient quantities of these casings produced in this country to supply the demand.' It appears from official records that in 1923 we took from pretty much all the earth over 19,850,000 pounds of sausage casings. In 1924 there were not so many, only 18,630,000 pounds.[1] Taken by tons that does not seem so great, about 9300 tons. But that weight unit is delusive, as we have said. It is a use of language to conceal truth. It's the length that counts. Try it thus: 'Casings,' says our packer friend, 'are handled one hundred yards to the bundle . . . and each bundle weighs in the neighborhood of one pound.' Therefore, behold, the

[1] Argentina, 6,800,498 pounds; Canada, 2,572,705 pounds; China, 2,282,461 pounds; Australia, 1,523,905 pounds; New Zealand, 1,200,755 pounds, etc.

18,630,000 pounds are in reality 1,863,000,000 yards, which means 5,589,000,000 feet, and, since there are 5280 feet in one mile, it is clear that we bring from other lands each year A MILLION MILES of sausage casings — with something more than three hundred million feet thrown in as extras in a small year. HOT DOG!!! Said we not they went to astronomical lengths? Think of eating sausages by the million miles, for remember that these are only the imported casings made from the intestines of alien sheep! We in America are the sausage-mongers of the earth, yet that commonplace food upon our table, seen in the light of things as they are, takes on a cosmopolitan character and becomes one more example of the inter-service of men. This is more apparent when we see that we export sausage casings in even greater volume than we take them in — almost 40,000,000 pounds in 1924 to thirty-five countries. Behold, how international are even the interiors of animals! The fact that half the outgoing casings are for Germany throws doubt on the Teutonic origin of many a wurst. It appears to be true that at an American breakfast table the sausage may come clothed in garments of Buenos Aires, and when in the following summer one eats in Dresden or Berlin the liverwurst may wear an American coat. The explanation of the paradox of both importing and exporting inter-

minable lengths of sausage casings lies in the fact that we have not enough of some kinds and have too many of others. We import chiefly the more valuable sheep casings for which our demand far exceeds our supply. We export cattle and hog casings of which the reverse is true. Our need in the latter case is for a market.

At the first thought it would appear that food has no place in our discussion, because we are the greatest food-exporting nation in the world, having on the face of the record enough for ourselves and abundance to spare. So great, indeed, is our marketable excess of foods that we sent abroad nearly a billion dollars' worth of them in 1924. Our sales of food to other countries have increased one half since the war as compared with the pre-war average.[1] Grain and grain products comprise nearly half of these exports, and when combined with meats and animal and fish fats and oils they make together nearly three quarters of all. The American hog is again supreme in our foreign sales of meat, for bacon, hams, and the like form much the largest group. Leaving aside, however, for the time the question of our dependence on other countries for markets, particularly upon Great

[1] Cf. *Foodstuffs Export Trade of the United States*, by Leslie A. Wheeler, Bureau of Foreign and Domestic Commerce, United States Department of Commerce, Trade Information Bulletin 355, July, 1925, p. 1.

Britain which takes more than one quarter of our food exports, there is something to be said upon the import side if a correct picture of the situation is to be drawn. The American hen, for example, has competitors across the Pacific, for China sends us appreciable quantities of eggs. We received from her, in 1924, 255,532 dozen eggs, and over 9000 TONS of dried and prepared eggs in different forms. It is interesting to note, also, that through Great Britain, the country which we are supposed to feed, there were shipped to us over 1,350,000 pounds of dried and prepared eggs that year. We export many million dozen of eggs in the shell, but in the last year for which comparable figures are available, 1921, our exports of nearly 27,000,000 dozen eggs must be compared with an equivalent importation of 62,000,000 dozen.[1] We may pass, as needing no special comment here, such well-known imported food elements as sugar, coffee, cocoa, tea, bananas, and grapefruit, although these come in great quantities and are vital factors in our daily living.[2] We are less familiar with oranges,

[1] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Eggs and Egg Products,' revised edition, 1922, pp. 32–33.

[2] Imports: cocoa or cacao beans, 1924, 378,281,807 pounds; coffee, 1,420,869,938 pounds of which 940,701,779 pounds from Brazil and 246,516,275 pounds from Colombia; tea, 92,772,890 pounds, of which 28,592,767 pounds from Japan. *Foreign Commerce and Navigation of the United States*, 1924, Bureau of Foreign and Domestic Commerce, United States Department of Commerce, p. 218.

Cane sugar, 8,271,607,070 pounds, *ibid.*, p. 220; bananas, 47,384,017

cherries, and grapes from Argentina and melons from Mexico. The fact that we brought 22,000 tons of canned tomatoes and over 8000 tons of prepared tomatoes besides from Italy in 1924 will surprise many. So will the importation in the first nine months of 1925 of over 1,130,000 bushels of dried beans, chiefly from Japan, Italy, France, and Madagascar. Many people will ask why we should bring an aggregate of more than 30,000 tons of tomato products from Italy and beans from thirty-four countries when we have so many at home, and questions of this kind constantly arise in connection with our dealings with other countries in which we at times export and import a like article. The answer often is a local need for funds or a seasonal supply or demand for some particular product.

On a single day in April, 1922, the New York wholesale market received among other supplies of the kind 800 crates of honey-dew melons from South Africa, 4000 crates of vegetables and a shipment of lima beans from Cuba, 10,000 packages of vegetables and 1700 barrels of potatoes from Bermuda, 4000 crates of onions from Chile, and 18,000 bags of onions from Egypt. During 1924 we brought in over 4000 tons of lentils, chiefly from Chile and Germany. The facts about such common

bunches, of which 13,125,731 were from Honduras; grapefruit, 15,562,984 pounds, almost wholly from Cuba.

things as onions, fresh tomatoes, and turnips are perhaps the most surprising of those relating to this group of foods. In 1924 we imported 37,750 tons of onions from twenty countries, of which 28,500 tons came from Spain and 4350 tons from Egypt. We took 22,000 tons of tomatoes from Mexico and 5000 tons from the West Indies including Cuba. Turnips appear to be a specialty of our northern neighbor, for Canada sent us in 1924 over 76,750 tons.

The dream of an America self-sufficient on the subject of foods is one from which we are awakening. A metropolitan journal states, 'Our [New York] markets receive a steady flow of food products from most parts of Europe by way of the North Sea and the Mediterranean, while shipments come even from the southern tip of Africa.' [1] We are prepared now to hear of potatoes from Egypt and Spain, garlic from Italy, Spain, and Chile, and canned peas from Belgium, France, Palestine, and Syria, though 8,000,000 pounds of sauces from Hongkong and Japan together renews surprise. More familiar items are what are called currants from Greece, dates from Hejaz and Arabia, and figs from Turkey in Asia. But over 27,000 tons of peanuts from China will prick our interest. These were some of the facts of 1924.

[1] *New York Times*, August 9, 1925.

It is not possible within the limits of space to go into further details of imported foods. Suffice it, then, to note the receipt of coconut oil and copra from the Philippines and Oceania, olive oil chiefly from Italy and Spain, ginger from Jamaica, West Africa, and India, nutmegs from the Island of Grenada and the Dutch East Indies, cinnamon from Ceylon and Java, pepper from the Dutch East Indies, and cloves from Zanzibar. If Java and the Malay States were to stop producing tapioca,[1] we should apparently have to go without. Our pistache nuts come to us from Alexandretta in the eastern Mediterranean and vanilla beans through France and Mexico. Over 37,000 tons of lemons arrived from Italy between January and July of 1925.[2]

Possibly the housewife to whom these facts may come will realize that the United States is not quite sufficient unto itself even with its great abundance of food. Our manufacturing bakeries use quantities of copra products for shortening, and the white flour in American kitchens is bolted in our mills through cloths woven in Switzerland from what is presumably Italian silk.

[1] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Starch and Related Materials,' revised edition, 1921, pp. 25–27.

[2] An interesting statement, entitled 'United States Foreign Trade in Vegetables,' by M. A. Wulfert, Foodstuffs Division, Bureau of Foreign and Domestic Commerce, United States Department of Commerce, appears in *The Cuba Review*, November, 1925, pp. 20–23. Published by Munson Steamship Line, New York.

'Let us depend on ourselves for our supplies,' were the words quoted at the beginning of this chapter. Willingly, so far as we may, but wonderful as the natural endowment of our country is and varied as are its manifold resources, one needs but to look beneath the surface of the daily movements of life to find that all men minister to us and that to this rule even our foods form no exceptions.

CHAPTER VI

DOMESTIC AFFAIRS

If the lady of the house, upon whose cuisine and domestic equipment comment was ventured in the preceding chapter, will bear with us a little longer, we will take advantage of her courtesy to consider some further details of her home environment. She must lay this continued intrusion to two of her sisters. One of them, residing in Hawaii, spoke enthusiastically of butter from New Zealand; the other, living in the continental United States, said, 'This Danish butter is so delightful.' The writer saw years ago in the free port of Copenhagen a large steamer filled with butter and with nothing else, intended for England, and was told that such a cargo went weekly. Not many Americans, however, realize that we also are the regular beneficiaries to-day of Danish creameries. Of course, one hears it said, a few peculiar people here and there may have such fanciful taste as the lady who is quoted above, but there can be no considerable number of them. We are as a nation great butter producers. On countless farms we simply milk the cow and make our own. Our cattle are on a thousand hills. Our dairies haunt the rural valleys and

every railroad has its milk trains. We sell condensed milk, butter and cheese to the world, and except, of course, for some few folk who like to be different, we are certainly in this respect quite independent of other countries. Are we not, indeed, makers of butter substitutes on a vast scale? Who can be so much better supplied than we are with these everyday, commonplace food factors that out of their excess they can add to our abundance?

There is enough of truth in such statements and questions to give them weight, but, like much else that appears in our studies, they present but part of the picture. It is, of course, much the larger part, but there is ample evidence that it is not a sufficient one. Nor can we say, 'Of course, Canada sends us a lot, but she is right next door and almost the same as ourselves.' That suggestion would be neighborly rather than explanatory, for the truth is that Canada is by no means the largest foreign shipper to us of butter and cheese. Argentina sends more and so does New Zealand. When it comes to selling fish, Canada is in the front rank, but as respects butter and cheese she is not in the 'majors,' though she does well with milk and cream, sending us more than any one else.

We drew butter from fourteen countries in 1924, not counting those which sent us but 15,000

pounds or less. Denmark was foremost with over 7,000,000 pounds; New Zealand next, with more than 4,000,000 pounds; then Argentina, sending over 3,000,000; and Canada with a little less than 3,000,000. Some came from Germany, England, Sweden, and the Netherlands. Cheese tells a similar story, but the order differs. Italy is first with more than 31,000,000 pounds; second, Switzerland, almost 14,000,000 pounds; third, France, over 4,000,000 pounds; Holland fourth, and Argentina fifth. Twenty-one countries each sent us over 15,000 pounds of cheese in 1924. The total exceeded 59,000,000 pounds, say, 29,500 net tons. The butter import was over 19,400,000 pounds, or 9700 net tons. Housekeepers readily visualize a ton of coal, but not so easily a ton of butter. Our receipts of butter were much more than double our shipments; the imports of cheese were almost fourteen times the exports. It happens also to be the fact that cheese was brought into twenty-two customs districts and butter into sixteen (omitting again totals of 15,000 pounds or less), so that the movement cannot be called local. Everybody's doing it. We seem to have a fairly intimate relation to the cattle of the earth through their butter, their cheese, and their hides, just as we look to the world's sheep for wool, sausage casings, and skins, to the interna-

tional hog for bristles, and to foreign hares and rabbits for hats.

We pass from the dining-room to the kitchen to consider the household utensils found there. In so far as these are of tin their origin has been discussed, and we know that tin is a great traveler whose presence in our homes, whatever its form may be, is due to the service rendered us by Malay workers in the Far East or the Indian toilers of the Bolivian Andes, having regard also to the British and Dutch capital invested in the former and American investors in the latter.

Of recent years, however, tin has been dethroned from its former place in our kitchens and aluminum has been by merit raised to the eminence that tin once held. We may now inquire, therefore, what international relations, if any, there are in connection with the newcomer. Again we find that our country is the largest producer. Our output of aluminum in 1923 and 1924 was greater than that of any other four countries combined — over 45 per cent of the world's product in the latter year.[1] Again, also, we find increasing dependence on foreign ores, and a tendency, as with newsprint

[1] Cf. *The Mineral Industry during 1924*, vol. XXXIII, article 'Aluminum and Bauxite,' by Robert J. Anderson, pp. 11–50, with bibliography; also *Political and Commercial Geology*, edited by J. E. Spurr, article 'Bauxite and Aluminum,' by J. M. Hill, McGraw-Hill Book Company, New York, 1920, p. 349 *et seq.*

paper, to export the industry in part to Canada, this time to take advantage of abounding water power there. An advertisement on October 29, 1925, offering for sale preferred stock of the Aluminum Company of America, states that the Company in addition to its plants in the United States owns and operates others at Shawinigan Falls, Quebec, and Toronto, Ontario, and is constructing a large aluminum-producing plant on the Saguenay River. It adds that the Company owns supplies of bauxite (the ore used) in both British and Dutch Guiana and 'other foreign countries.' The tendency is toward greater dependence on the South American ores. The domestic production of bauxite fell off in 1924 by 34 per cent from the previous year. Our home output in 1924 was 346,553 long tons; our imports 201,974 long tons.[1] The industry is, therefore, one of those which has taken on an international character, obtaining raw materials and doing a large part of its manufacturing under other political jurisdictions than our own, while finding its major market here. It is one more illustration of the economic ties that unite the nations, showing how tragic and destructive would be the ruptures of war.

[1] Cf. *The Mineral Industry during 1924*, vol. XXXIII, article 'Aluminum and Bauxite,' by Robert J. Anderson, p. 38; also *Mineral Resources of the United States in 1922*, United States Geological Survey, Department of the Interior, 1925, Part I, p. 22A; also same for 1924, published August 10, 1925, p. 22A.

This light metal, aluminum, which has come into general service within the last generation, enters intimately into our lives. It is extensively used in domestic utensils, but finds its most important field in automobiles. It is common as foil and as an alloy, forming an essential part in the duralumin which is the structural material of dirigibles. It finds increasing service as paint and is effective as an electrical conductor. A recent estimate [1] says that 50 per cent of the aluminum consumed in the United States is taken for automobiles, 10 per cent for electrical conductors, 10 per cent for cooking appliances, a like amount for the general engineering trades, 10 per cent for use by the steel industry, and a final 10 per cent for aircraft, paint, chemical equipment, and miscellaneous uses. Bauxite is utilized for abrasives, refractories, and cements, and for making aluminum salts.

It is interesting to note that this material takes its name from the abandoned fortified town of Les Baux in southern France. Bauxite was named from this deserted city long before its product, aluminum, came into general use.[2]

We have trespassed rather long upon the culinary department and discretion bids us return to the

[1] Cf. *The Mineral Industry during 1924, supra,* p. 34.

[2] Cf. *Touring Through France,* by Elizabeth Shackleton, Penn Publishing Company, Philadelphia, 1925, pp. 273–75. This gives an interesting account of 'the abandoned hill town of Les Baux.'

living quarters to find what may be there that will illustrate our theme. The eye lights upon the telephone and follows the wire till it disappears in the wall. Our imagination outreaches the eye and continues with that wire to the 'central' and beyond into the great telephone cable laid of late between New York and Chicago at vast cost. This cable is itself unique in all the world, without a fellow anywhere as yet. Each of the hundreds of wires composing that great national spinal cord is wrapped with insulating paper specially made for the purpose from a material — manila fiber — which is collected in the form of old cordage in all the leading seaports of the globe. Original as abaca in the Philippines, manufactured into cordage in major part in the United States, it found its way into ships on every sea and under many flags. Softened by weather and worn by use, it was dropped derelict wherever replacement was required. Thence it was gathered anew and now finds its final resting-place in that service of sound which is so wonderful a part of our modern equipment. Nor is this all that cable has to tell us. China plays a vital part in it, as we shall later see.

Each of the central offices with which this cable connects is a cosmos in itself, a world nerve ganglion not only in use but in origin, a 'central' indeed in a sense not often grasped. There, as by a centri-

petal force which does in truth exist in the insistent demands of electrical engineers, are gathered the products of all nations and of the animal, vegetable, and mineral kingdoms. There silk abounds, and shellac, there nickel, tin, and platinum are found, there rubber holds an essential place, and mahogany is but one of the foreign forest products that serve. Standing in that central station through which the tides of life are always pulsing, one with imagination, guided by intelligent knowledge of the world as it now is, can visualize the laborers of many lands, of different races and varied social conditions, whose toil has contributed to make it possible for us to speak afar. It would be even more ridiculous to talk there of self-sufficiency than in a tannery or a hat factory or a carpet mill, for no one country in the world — no two or three countries combined — could provide the materials which are concentrated in that place. Science may speak with patriotic voice and work with hands guided by patriotism, but mere nationalism is impossible to it. It gathers from all lands, even from air and sea, that which is of service to its homeland, as well as that which passes thence to enrich men everywhere.

We must not be content, however, to look only at the central office and its contents. Let us take up the telephone instrument itself and ask from

whence it came. The answer is prompt and clear. 'These men,' say the Western Electric Company, 'made your telephone' — a Japanese who prepared the silk in the covering on the cord, a British Indian who mined the mica used within the instrument as insulation, a Brazilian or more likely a Sumatran or Malay native who gathered rubber from a tree in forest or plantation, an Irishman who grew and gathered the flax for fiber used in the paper in the condenser, a Russian who in the Urals mined the platinum required, an Egyptian who cultivated in the Nile Valley cotton also for insulation, a South African or it may be an Alaskan gold miner whose product also the telephone needs: these seven workers, each in his separate land, combine with the coal miner of Pennsylvania to furnish the materials which American electricians, engineers, and mechanics form into that 'far-speaker,' the telephone, which thousands unthinkingly use not knowing whence it came. If a telephone engineer were some day to write an article entitled 'The World in a Telephone,' the name would not overstate his case. Without the compassing of the whole round globe for materials a telephone and its 'central' is not and cannot be.

The thought of the great cable stretching inward far away recalls those older and smaller (save in length) members of the cable family that pass

eastward underseas. The engineers under whose direction trans-ocean cables are designed, manufactured, and maintained are not blind to their dependence on other lands for an essential factor in the cables which we cannot supply. Has an international cable ever been made in America? The question whether one could be made here, came up officially in war-time and was negatively answered. Why, seeing we are wizards in the making and use of wire and in the designing and manufacture of electrical instruments? Why not, indeed, when the Atlantic cable, like all telegraphing by wire, was an American idea? The answer is as final as simple. We do not produce and we do not control gutta-percha, and gutta-percha must be had. That is another far-fetched material, the product, like rubber and tin and rattan, of that Malay Peninsula and its environs of which we think so little and on which we depend so much. This gum is the best non-conductor known for heat and electricity.[1] The highest quality is the product of the tree, Palaquium Gutta, and looks like rubber when it is in the latex. It is less elastic, and when heated will on cooling retain

[1] The United States Bureau of Standards is studying the development of rubber compounds for marine-cable insulation and some have been found better than gutta-percha in electrical properties. Cf. *Annual Report*, Director, United States Bureau of Standards, for fiscal year ending June 30, 1925, p. 5.

the shape into which it may have been moulded hot. It remains unaltered indefinitely under water, and its greatest use is in coating submarine cables.[1] We brought over three million pounds from Singapore in 1924.

It would be surprising if the electric lamp failed to illuminate our subject as it does all else. Such a lamp is near the telephone and we turn to it as of course. It tells a tale of five continents and of remote sea islands, and takes us for the first time to Greenland whence comes the cryolite.[2] Germany is there and China — China very particularly in the tungsten filament — and India makes a double appearance in shellac and mica. We discover also Spain and Insulinde, as the Dutchmen call their East Indies, Brazil, Chile, and once more the Caucasus — all in one electric lamp.[3] That small bulb which has become so common a thing is in miniature what we found the greatest telephone

[1] Cf. *Gutta-Percha,* Malayan Series XVIII, British Empire Exhibition, 1924. Printed for the Malayan Governments by Fraser and Neave, Ltd., Singapore, 1923.

[2] Cf. *The Mineral Industry during 1924,* vol. XXXIII, p. 254, McGraw-Hill Book Company, New York, 1925.

[3] List of materials furnished by Mr. Samuel H. Hibben, of the Westinghouse Lamp Company. Cf. also article 'The Electric Incandescent Lamp Business of the World,' by Francis W. Willcox, of General Electric Company, in *The Digest,* October, 1925, p. 19, published by International General Electric Company; also, *Where Do Lamps Come From?* by Katherine Woods, Book 25, National Lamp Works of General Electric Co., Cleveland, Ohio, an interesting monograph.

central to be on a far larger scale — a cosmos. Into it are compacted the products of many of our own States and of a dozen foreign lands. Nickel, tungsten, tin, thorium, potash, manganese, molybdenum, unite with copper, zinc, lead, iron, and other materials to make the simple lamp which yet is so complex.

We pause for a moment to ask, why go to India for mica? Many a boy has, like the writer, split small pieces of it with a knife from the native rock. North Carolina and New Hampshire produce it and there is more in other States. Why, then, carry it half around the globe? Differences of character, quality, and cost explain it. India dominates the market for split mica and produces more than two thirds of the world's supply, though by very primitive methods. We use nearly half the world's provision of sheet mica and mica splittings, consuming our own production [1] and much more from India and elsewhere. Our output in 1924 was 1,460,000 pounds of sheet mica and 4709 short tons of scrap mica. We imported 5,320,000 pounds of cut, split, and manufactured mica, 1,342,000 pounds of ground mica, and 625,000 pounds of unmanufactured. India sent us over 3,100,000

[1] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Mica,' revised edition, 1921, p. 8; also *The Mineral Industry during 1924*, vol. xxxiii, p. 490, McGraw-Hill Book Company, New York, 1925.

pounds and Canada 2,100,000 pounds. Electrical equipment and appliances require this non-inflammable and insulating mineral. It is found in phonographs, stoves, and goggles, and, when ground, in roofing, lubricating materials, in so-called mica boards, and in some wall-papers. The radio industry uses it for condensers, head-phones, and loud-speakers. It is an essential part of international trade.

The story of the electric lamp shows how necessary it is to revise our thinking to keep pace with the progress of science. The world goes on for centuries thinking along certain established grooves. Suddenly comes a metallurgical chemist who unites with an electrician to turn our mental world upside down. We can no longer think as respects light in terms of candles or kerosene lamps or even of gaslights, for the electric lamp has changed all that, and in changing it has altered in an essential respect our relation to the world, and with that again our ways of thinking about that world. When a country consumes over 336,000,000 electric lamps in a year; when these are in every office, home, and factory, and their use increases by leaps and bounds; when every one of them calls not for one but for many materials which we cannot ourselves furnish; when these conditions have come to stay and to expand, our world outlook

must expand also lest our physical environment outgrow our comprehension and we be left ignorantly wondering amidst an enlightened world. It is an inexorable necessity that public policy shall follow in the path made broad and plain by science. We cannot do candle-light thinking in an electric-light world. The legislator who turns on the electric lamp over his desk or speaks through the telephone that stands thereon would do well to consider whether the former has illuminated his mind or the latter has conveyed to his understanding its true but unspoken message.

Platinum has been mentioned in connection with the telephone instrument. It plays a part also in amplifiers along the cable line, it appears upon my lady's dressing-case or on her person as jewelry, it has important functions in chemistry and others in dentistry. As we produce almost none (less than one per cent of the world's output in 1917) while we use more than any one else, it is well to consider whence comes this luxury in peace and this necessity in war.

In a study of necessary raw materials made in the Ordnance Office of our War Department in 1924, to which further reference will appear hereafter, it is said, 'Russia and Colombia have a natural monopoly of the platinum mining industry

of the world. The metal occurs . . . in the United States, but in amounts so small that they have but little influence on the world's supply.' Our Tariff Commission says, 'The United States being dependent upon foreign countries . . . for its supply of platinum, prices in the United States . . . are obviously affected by conditions in those countries.'[1] A sound statement, indeed, of a truth not limited to platinum or prices. Many things for which we are dependent upon foreign countries affect our lives in the most intimate ways so that the conditions of life and labor in Australia, India, China, and many other lands are daily reflected into every home in America.

'In time of war,' says our Ordnance statement, 'the use of platinum in jewelry can, of course, be restricted or even entirely prohibited.' It was so restricted in 1917–18, for the metal was required in the production of strong sulphuric acid and nitric acid needed to make explosives. The effort to procure a sufficient supply fell under the writer's close observation during the World War, and no one who passed through the experience will ever forget what it meant to be in absolute need of an essential article which we did not and could not produce. Twice we were obliged to send to Russia

[1] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Platinum, etc.,' revised edition, 1921, p. 33.

for quantities of platinum to keep our makers of explosives supplied. The words then officially used about our need of the metal were 'vitally necessary' and to be obtained 'almost at any cost.' The first large lot of 21,000 ounces was gathered in and through Petrograd and came early in 1918 consigned to the writer.[1] It remained in his possession just long enough to endorse the documents that turned it over to the War Department, for the custody of many thousand ounces of urgently needed material, intended for some one else, and worth over $90 an ounce, was neither safe nor desirable. One felt much more comfortable when it was sent where it belonged. Later that same year it became necessary to obtain more. The task was successfully carried out by Mr. Charles Leroy Preston, who sacrificed his life in the accomplishment. The heroic story of his romantic mission has been told in detail elsewhere and cannot be repeated here.[2] During that same period also such encouragement as was possible was given to the development of a supply from the river valleys of Colombia, and our imports of late have increasingly come from that country, as the troubles of Russia have almost cut off her production from the world.

[1] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Platinum, etc.,' revised edition, 1921, p. 33.

[2] Cf. *With Congress and Cabinet*, by William C. Redfield, Doubleday, Page and Company, 1923, pp. 190–204.

During the year 1924 we imported 95,713 ounces troy, of which 43,463 came from Colombia, and 37,253 trans-shipped through England, possibly including some Colombian product as well as some from Russia. These two countries are the source of a necessary material the production of which seems to be declining, subject, of course, to the possibility that when Russia shall find herself again the output of the noble metal from the Ural Mountains may increase.

Platinum has an interesting family of metals gathered about it, iridium, osmi-iridium, palladium, osmium, rhodium, and ruthenium. They are not all strangers, as witness this advertisement in the show window of a stationery shop. 'Take gold from the Transvaal,' it says as a caption, 'osmi-iridium from the platinum mines of the Ural Mountains, rubber gathered by natives of the Amazon River Valley, work them together in London and New York with the highest mechanical skill, and you have' such and such a fountain pen. The alloy of nine parts platinum and one part iridium, says an official statement, 'is extremely hard, as elastic as steel, absolutely unaffected by the atmosphere, and capable of taking a high polish. Of it is made the international standard meter, kept in Paris.' 'Our resources,' continues the report, 'are very meager with no

prospect of enlargement.'[1] Iridium comes, or did come, from Russia, and is found in Colombia, Tasmania, Borneo, New South Wales, British Columbia, and Quebec, but the total annual production of it hardly exceeds 5000 ounces. Palladium, of which Canada has the most, and of which our domestic resources are insignificant,[2] is used in laboratory utensils, jewelry, and in dental work as a substitute for platinum. Osmium was used for incandescent lamps till tungsten replaced it. Rhodium and osmium make useful alloys with platinum, the former in small crucibles. Ruthenium has as yet no place in the arts.

Platinum, we may say in review, is required for utensils and dishes in chemical laboratories, for electrodes, in the ignition system of gasoline engines — platinum points — and in combination with iridium for settings for precious stones. The War Industries Board estimated its various uses in 1917 as follows: jewelry, 27.3 per cent; dentistry, 16 per cent; physical and chemical equipment industries, 27 per cent; electrical equipment industries, 29.7 per cent.[3]

In August, 1925, the statement was published that a new source for platinum had been discovered

[1] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Platinum, etc.,' revised edition, 1921, pp. 36, 37.

[2] Cf. *ibid.*, p. 39.

[3] Cf. *ibid.*, p. 51.

near Johannesburg in the Transvaal.[1] If this is confirmed, it may cause the price of the precious metal to fall, but it will not alter our own relation to the supply. Platinum in pen or automobile or telephone or jewelry touches our life nearly, but we have none of our own or almost none.

The lady of the house, upon whose personal jewelry we have commented and into whose cuisine and living-rooms we intruded in this chapter, must be prepared for more surprises when the domestic environment is considered further. For, though statesmen may rage and orators imagine a vain thing, we, the people of the United States, are not content so narrowly to restrict our lives as would be the case were we to confine them within the limits of what even this great country can of itself supply. It is this normal, irresistible, expansive outreach — unconscious though in large part it may be — of which our leaders in public affairs may well take heed. This individualistic demand for a larger and better standard of living has made America great, but it has also outgrown the boundaries of the geographical United States. In a hundred visible ways, and in as many more that are unseen, it has projected the requirements of our homes and of our industries out into the world arena. The various peoples of mankind have

[1] Cf. *New York Times*, August 18, 1925.

hitherto ministered to us in religion, literature, art, science, and music. Still we are not content, for there is more with which they can help to enlarge our lives. We want it all. The best of the ages has been given us; the best that earth has to-day is none too good for us. We want now that the nations of the world shall serve us in the economic sphere as they long have done in the intellectual realm. We want the earth as our friend and servant in our daily living for what it can produce in our behalf. We are not content — we cannot be content — with anything less.

CHAPTER VII

THE PASSING SHOW

WHAT is more commonplace and more intensely local than to ride in a subway through a tunnel under one of our great municipal rivers? A man, going like thousands of others to the daily grind, was thinking thus when he entered the station, went down in the elevator, and took the train on the way to his office. Then and there life was running in a narrow groove. Everything shut him in; everybody was unpleasantly near, and the man wanted to break out into the larger spaces.

An advertisement in the end of the car caught his eye. It was only a blurb about soap, but whoever wrote it had something of the vision of the far-flung world for which the man was hungering, and had expressed it rather well. There was a picture of three trees. One was an African palm, another an olive tree, the third a coconut palm, each shown in its native environment. Through them the eye of the mind caught a glimpse of Italy and Spain, of the African jungle and of the Pacific isles which 'lift their fronded palms in air.'

A girl near was reading the current issue of a woman's magazine and the man's eye could not

escape the full-page advertisement turned toward him. It told of rare fabrics which 'Our artists have brought from the South Seas, from quaint villages of China, Italy, Switzerland, and France.' Shantung linen was one, 'Florentines and Venetians' were others. There were pictures of the canals of Venice, of Parisian arches, of scenes in the coral islands and in Eastern cities.

A departing passenger threw aside his magazine. The man picked it up and saw an article saying that German purchases of American phosphates were growing, and so were those of Japan. It pointed out also that the French in Africa had greatly increased their phosphate output and that our producers may have to reckon with their competition. Our traveler glanced at the placards that made a bright line of color overhead, and some of them appealed to his mood. One spoke of spices from 'far Cathay'; another of rubber heels, which carried his thought to Malaya; the third dealt with silk stockings, reminding of Japan. It was not such a small world after all, even in a subway car. A good deal of life was reflected there in that crowded carrier of a throng of workers to their daily toil.

The train stopped and many left the car. The man had to wait for one station more. He looked at the rattan seats and thought whence they had come and how he would like to retrace their road.

It would be such a rest to cross the Atlantic, to continue through the blue Mediterranean and the Red Sea, to traverse the Indian Ocean and the Straits of Malacca, until in the romantic islands of the Far East he found the change of scene that he craved. 'But,' he said to himself as he mounted the subway steps, 'after all, one with vision may learn much even on the way to work.'

This story, which is no fable, suggests that there are people who see and those who do not. Perhaps the thought is better put by saying that there are people whose eyes are near-sighted and others whose minds are near-sighted. The first know their limitations and wisely go to oculists and opticians to have them enlarged or removed. The second are not always conscious of their partial blindness, indeed, some of them seem to think they see well.

It would not be just, however, to be too critical of these good, near-sighted (perhaps we should say near-minded) friends. Rather, let us take one of them on a short walk along the highways and by-ways of a great city in the luncheon hour of the day and see what is to be learned there. He is a good fellow, this friend of ours, an upright, well-meaning citizen. The difficulty with him is that he sees only the surface of things, and to be fair he has little opportunity to do otherwise. In sincere good will

he has taken an hour off for a walk with us to-day and we are glad to be with him.

Pause a moment as we pass this factory and look in the open door of the fire room. There is only a man shoveling coal into the fire beneath the boiler with a scoop shovel. It is just an ordinary scoop shovel; no story there. Not quite so fast. There are shovels and shovels, and this one, a good American by fabrication, was in part original to two other countries, one, Rhodesia in far Africa, the other, Canada in North America, for it is made of chrome nickel steel.

As we stand in the door, look up. The main steam pipe leading over to the engine is covered with something under canvas held by brass bands. What is under that? Asbestos pipe-covering (insulation) to keep the steam warm. It is a sort of tea-cosey on a large scale. We have to go to our northern neighbor for the material to make it. They send us thousands, yes, scores of thousands of tons, and, as the little girl said, 'even more still yet'; and this Canadian product is put to good service by and for American workers all over our land.[1] We use it in automobile brake and clutch linings, in cements and packings, in sheets and

[1] Imports, unmanufactured asbestos, 1923, 189,661 tons; 1924, 163,616 tons (almost wholly from Canada). Manufactured asbestos, 1923, 15,068,546 pounds; 1924, 22,004,759 pounds (chiefly from Belgium).

boards, and for fireproof curtains; we even shingle houses with it to the great comfort of some people who rejoice in their burnless roofs. Uncle Sam himself says it is of 'enormous importance' and on many a household table it is a warm friend.[1]

We follow the steam pipe into the engine room. The engineer asks us to wipe our feet because he is particular to keep his surroundings clean. Look at the mat as you do so. It is just an ordinary cocoa mat, but it traveled from Ceylon or India to serve you this morning. Now, stand at one side of the room and see the great wheels revolve. You can't slip; the Malay Peninsula prevents that, for the floor is covered with ribbed rubber.

Our friend says he must go, and we pass out into the street. It is not a busy, crowded avenue with a great mass of traffic, but instead a long street with wharves at one end and a bridge at the other. So there is a certain amount of through movement and the vehicles come one by one, for the roadway is narrow. Is there nothing we can learn from the passing trucks as we walk back to the office? The first to pass is that of a vegetable vendor loaded high with big Spanish onions each a handful in itself, and we remember that steamers from Spain dock just below. Here are two motor trucks loaded

[1] Cf. *The Mineral Industry during 1924*, edited by G. A. Roush, vol. XXXIII, p. 71, article 'Asbestos,' by Oliver Bowles, McGraw-Hill Book Company, New York, 1925.

with great rolls covered with wooden slats. Did you read the marks, 'Made in Finland,' as they ran by? It's newsprint paper from across the sea. Down the street toward us lumbers a motor truck with high racks on each side. It is piled with jute bags. There are no labels that we can see, but those bags come from India. Quick, before it gets too far, see that chemical truck and look at the barrels in it. They are marked, 'Made in Germany.' Here is one more, full of cases said to be canned tomatoes. They bear the words 'Made in Italy,' and we remember hearing that many come from there. That steamer called The Terrier which we saw from the bridge was flying the Norwegian flag, and here comes a truck from the wharf where she lies. It is full of boxes marked 'Sardines, made in Norway.' See on that box upon the dray yonder 'Palembang, Sumatra.'

These actual incidents taken by the wayside give glimpses of the tides of trade. They make us smile to read in the papers that this is a self-contained country. Let us hope it will never become wholly so, for how, indeed, should we get shoes?

Interesting facts develop when we consider in some detail these various commodities. Our domestic soap industry is a strong one and the products of the great packing houses provide it with a large volume of materials. The imports of soap are

small relatively to the consumption — less than one per cent of the value of our output. More than one third the importations are of so-called Castile soaps. Some fine toilet soaps come from France which supplied in 1924 38 per cent of our soap imports.[1]

The case is altered when we turn from the finished product to the materials required to make it. The Tariff Commission in its study of our soap production divides the fats and oils consumed by the industry (on the basis of 1917) into three groups.[2] These are vegetable fats and oils, those derived from animals and fish — which two are of substantially equal volume — and third, secondary fats and oils.[3] The last two groups, comprising about seven twelfths of all, are substantially of domestic origin, subject to possible allowances for olive oil 'foots' and, perhaps, for whale and herring oil.

[1] Cf. *Foreign Commerce and Navigation of the United States*, calendar year 1924, p. 270.

A mine of information respecting Castile soaps is found in the documents submitted by counsel for James S. Kirk and Company in support of their motion (Docket no. 1110) to dismiss complaint before the Federal Trade Commission, January, 1925.

[2] Cf. *The Production and Conservation of Fats and Oils in the United States*, Bulletin 769, United States Department of Agriculture, February 10, 1919; also *Tariff Information Surveys*, United States Tariff Commission, revised edition, 1921, *Soaps, etc.*, p. 23.

[3] Year 1917:

Vegetable fats and oils	509,705,000 pounds
Animal and fish fats and oils	519,823,166 pounds
Secondary fats and oils	239,105,000 pounds
Total	1,268,633,166 pounds

Our interest centers on the first division, vegetable fats and oils. There are fifteen items in this group, twelve of which come wholly or partly from foreign sources comprising 71 per cent in weight of all. The largest foreign item is coconut oil. Others of importance are soy-bean oil, peanut oil, palm and palm kernel oil, olive, linseed, and Chinese wood or nut oils, and Chinese vegetable tallow. The chief domestic factor in this group is cottonseed oil, 126,390,000 pounds of which compares with 168,600,000 pounds of coconut oil. Corn oil is also a domestic element amounting to about half the palm and palm kernel oils in volume. This phase of the subject opens to consideration the economic status of this country in the important respect of vegetable oils.[1] These not only enter into foods, but are essential elements in many industrial products of which soap is but one. Among such are paints and varnishes, printing inks, pharmaceutical supplies, lubricants, and, with palm oil, the making of tinplate.

The laity in such matters will be surprised that we import cottonseed from Mexico (68,800,000 pounds in 1923 and 95,000,000 in 1924) to make the useful oil of which we eat so much in lard and butter substitutes. The great manufacturing

[1] Cf. 'Oils, Expressed or Extracted,' *Dictionary of Tariff Information*, United States Tariff Commission, September, 1924, p. 526.

bakeries weekly absorb many tons of these substitutes for shortening. Our domestic production of cottonseed oil is enormous and we export it freely. Its great rival is coconut oil. The meat or kernel of the coconut when dried is copra; from this the oil is extracted. Both the oil and copra come to us in great quantities (1923, oil, 181,800,000 pounds, copra, 332,900,000 pounds; 1924, oil, 224,750,000 pounds, copra, 291,000,000 pounds). The source is the Philippines;[1] the oil and four fifths of the copra come from there, the balance of the copra from French and British Oceania. If the Government of the Philippine Islands were to fall into unstable hands, our coconut oil problem would become serious; if the islands fell into hostile hands, it would be acute. We need the oil for food, for cooking fats, for soap, and for pharmaceutical preparations. The demand for it is nation-wide and expanding. The results of a shortage would be quickly reflected into every American home. Yet in the discussions of Philippine independence the safeguarding of this vital supply (or that of fibers) does not openly enter. We seem to treat it with the same nonchalant assurance that all will always be well that we betray in our general assumption of self-sufficiency.

[1] Cf. *Trade in Philippine Copra and Coconut Oil*, Bureau of Foreign and Domestic Commerce, United States Department of Commerce, Trade Promotion Series 11, by E. D. Gothwaite, 1925.

It is often striking and sometimes appalling to notice how the progress of the world moves *past* the thought of men leaving them, self-deceived, in the rear. A man of fifty to-day, whose general outlook on the world is like that which he had at twenty-five or even thirty, is blind to facts, for a new world has sprung up which he does not see. He is like one looking at the rear lights of a train that has passed. Factors that control to-day in many an industry and that reach into our household lives have names that only twenty years ago were strange. The chemist destroys and builds and men go on thinking in terms of the things destroyed, careless even of the name of the new structure until some shock wakes attention to the fact that the world has moved forward. The relations of the United States to the world have altered in a hundred ways since 1900. They are more intimate, more numerous, more vital. They have crept unobserved into our personal lives even when their presence is denied, so that we have the humorous or tragic spectacle of men proclaiming a self-sufficient America while using the help of all the world to do it.

What in health have we to do with castor oil? Most of us think of it in connection with a small bottle and a teaspoon and are willing to forget. It does not seem to infest the family shelves as of old.

Why, then, hunt afar for the beans and get so many since they have no value save for the oil? Our friends who take the air could tell us, for they have been eager to take castor oil, not into themselves, indeed, but into their airplane engines as a lubricant. Perfumery chemists use it as a base for many fragrant things. It is required for making sulphonated oils which fill industrial demands. To one who is neither druggist nor aviator it is strange, nevertheless, to think of castor beans in units of 10,000 tons. Nor is that a great many, as things now are. We took over 88,500,000 pounds in 1923, almost 85,000,000 pounds in the following year, and 80,138,000 pounds in the first nine months of 1925, an increase of 23.4 per cent over the like period of the previous year, chiefly from British India, with Brazil, Spain, and China helping. Subsidiary uses are in soap and for leather dressing.

The mention of palm oil and its related palm kernel oil recalls what we have already said about tin. Soap-making and tinplate manufacture account for most of the palm oil, in the latter case blended with cottonseed and mineral oils. The west of Africa is the source of supply. Some is trans-shipped from Germany and England,[1] but for

[1] 1924:

From Germany	20,570,971 pounds
From England	24,086,753 pounds
From Belgian Kongo	13,934,742 pounds

Cf. p. 217, *Foreign Commerce and Navigation of the United States*, 1924, United States Department of Commerce.

the most part it comes direct from British West Africa (42,190,000 pounds in 1924) and the Belgian Kongo. We received in all from abroad, in 1924, 106,500,000 pounds (53,250 net *tons*). How many of us ever see it? But look again at a tin dipper, for, like the salesman's overcoat in the expense account, 'it's there all the same.'

Argentina is the largest producer of flaxseed in the world, and although our paint and varnish manufacturers strive to stimulate our farmers to increase the area sown with flax, we still linger far behind and are content to buy seed from her — 21,150,000 bushels in 1923, 13,830,000 in 1924 — besides importing linseed oil, most of it from England.[1] In general, it is correct to say that our Eastern oil mills run on Argentine seed, our Western ones on domestic seed, but the division is not rigid. Sometimes an Eastern mill will buy our Western flaxseed for reasons of price or quality, and presumably our Western linseed oil mills may occasionally take a similar course. Our production of linseed or flaxseed oil — the double name is a curious survival — is large, over 653,500,000 pounds in 1923,[2] and more the following year. It

[1] In 1923, 43,096,714 pounds of linseed oil, of which from England, 32,892,678 pounds, Netherlands, 8,996,889 pounds; in 1924, 13,247,190 pounds, of which from England, 10,830,217 pounds, Netherlands, 2,375,852 pounds. Our crop of flaxseed was estimated by the Government on November 10, 1925, as 22,332,000 bushels.

[2] Cf. *Animal and Vegetable Fats and Oils*, Bureau of the Census,

is indispensable in paints and varnish as a drying oil, and few indeed are the houses in which it has not been used, often both within and without. Every 'clean up and paint up' campaign calls for more of it. The name 'linoleum' tells of its presence; the word 'oilcloth' is similarly revealing. It goes into soaps, lithographic and printing inks, and patent leather, and is a constituent of putty. Our native supply of flaxseed is insufficient, and we have to purchase abroad more than half as much as we produce in order to keep our mills moving.

We eat our home-grown peanuts, using the culls for oil; then we proceed, as in 1924, to bring over 60,000,000 pounds of peanuts (that's a lot, 30,000 *tons* of an article many see only in five-cent bags) from nine countries in Asia and Europe, and over 15,300,000 pounds of peanut oil from ten countries, chiefly China and France. The oil is a salad oil, is mixed with olive oil, and is used in margarine and soap. China and our own country are the greatest peanut producers, but France, in the city of Marseilles, is the chief oil-maker.

Olive oil is in every restaurant, hotel, and home, but if any one thinks it is not an imported article he must revise his views to fit the facts. California makes substantially all our home output, but it is

United States Department of Commerce, 1925, p. 4; also *Dictionary of Tariff Information*, United States Tariff Commission, 1924, p. 529, for consumption over a series of years.

only a small part of the olive oil we use. In 1924 we produced 1,530,000 pounds and imported 108,100,000 pounds.[1] Our receipts that year came from thirteen countries including Italy, Spain, France, Greece, Portugal, and Algeria, with Tunis. About 40 per cent of our own olive crop is used for oil, to which the culls and injured fruit are added. The oil is used medicinally as well as for the table, and the 'foots' or denatured oil taken from the final pressings is material for soap, and finds use in wool spinning and for lubrication.

We have greatly increased the domestic crop of soya beans, but use few of them for oil. In 1924 we made 2,740,000 pounds of oil and imported 9,125,000 pounds from the Far East, plus 4,180,000 pounds of the beans. The oil is a newcomer which appeared on the scene about twenty years ago. Now it is a rival of cottonseed oil in soap and is used in paint. Vegetable tallow is a fat from the seeds of a Chinese tree and was used in our soap to the extent of 8,500,000 pounds in 1923 and 5,100,000 pounds in 1924.[2]

A material of great importance to our paint and varnish industry is Chinese wood oil or tung oil, which is made from the fruit (nuts) of a tree that grows wild in many parts of China. This oil is

[1] Cf. *Animal and Vegetable Fats and Oils, supra*, pp. 4, 15.
[2] Cf. *ibid.*

said to be the base of most modern waterproof, quick-drying varnish. The disturbances in China have interfered with the regularity of our supply, and it is well that a promising start has been made in cultivating the trees in our Southern States where soil and climate seem adapted to them. Over one hundred thousand trees have been planted and the enterprise is expanding. It must be some years before direct results in the production of oil can come from this wise effort and a long period must pass before the product, though satisfactory in character and quality, can relieve us from dependence on China for a material which has become essential. We imported in 1924 over 81,500,000 pounds of China wood oil, and more the previous year. Imports in the first nine months of 1925 were 70,841,000 pounds, an increase of 36.9 per cent over the like period of the year before.[1] We have ordinarily taken four fifths of the Chinese product to the extent, says one authority, of 'over twelve million gallons a year.'[2]

So much for oils: we leave them, not for lack of material, but because the volume of it is so vast. Those who are interested to pursue this subject

[1] Cf. *Animal and Vegetable Fats and Oils, supra*, p. 14.

[2] Cf. *Chemistry in Industry*, The Chemical Foundation, Inc., New York, 1925. Article on 'Paints, Varnishes, and Colors,' by Henry A. Gardner, Director, Scientific Section, Paint and Varnish Manufacturers' Association of the United States, vol. II, pp. 232–59.

will find a spur to inquiry in the fact that we take vegetable wax from twenty countries to the extent of nearly 8,000,000 pounds in 1924 and almost 11,000,000 pounds of 'other vegetable oils' that year. Having, however, a volume at hand [1] in which various oils are indexed under 133 headings, the part of wisdom is to remember that sufficient is as good as a feast and in mercy to desist.

An American manufacturer of reed furniture in our Central West was speaking on January 6, 1921, to a Congressional committee. After telling that his company made reed chairs and also reed and cane, he said in part:

> Previous to the war . . . we obtained our reed from . . . Hamburg, Germany. With the outbreak of the war we secured all the reeds we could in New York. This being a limited supply, we had to look elsewhere. We purchased the raw material — rattan from which reed is manufactured — in London, shipped it to Holland and from Holland to Germany, where we exchanged it with the Germans for reed. In the meantime we were equipping a factory . . . to start the manufacture of reeds. We went to the Orient and established a purchasing agency at Singapore where we bought the raw material, rattan, from which to manufacture our reeds.

Rattan is a trade name for the strong, flexible stems or shoots of a variety of climbing palm that grows chiefly in the tropics of the Eastern Hemi-

[1] *Manual of Industrial Chemistry*, edited by Allen Rogers, D. Van Nostrand and Company, New York, pp. 401, 657.

sphere. The most important belong to the genus Calamus, but there are rattans of six other genera. The Malay Archipelago produces most of the supply and it enters into commerce through the port of Singapore. It is one of the longest of all plants. One stem which was 556 feet long, from a variety known locally as 'Rotan Manau,' was exhibited at the Malay-Borneo Exhibition in 1922. Plants of this kind have been reported as long as 660 feet.[1] A much more usual length is from 120 to 200 feet. About one hundred species of rattan are known from British Malaya, of which perhaps half are in commercial use. Malacca canes are cut from a species locally known as 'Rotan Semambu.' Our Government reports say [2] 'the rattan of commerce as a raw material is not produced in the United States.' Our domestic cane and reed industry depends on the imported rattan.

We put it to manifold uses. The strong, tough fibers and the flinty surface of the rattan make it valuable to cover containers of acids. Cane for chairs and couches are made of it, furniture, baskets, and traveling-bags, balloon cars, latticework, brooms, whips, handles, and walking-sticks.

[1] Cf. *Rattan*, Malayan Series, XVII, British Empire Exhibition, London, 1924. Printed for the Malayan Governments by Fraser and Neave, Ltd., Singapore, pp. 1–18.

[2] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Rattan and Willow,' revised edition, 1921, p. 7.

Fruit-dealers, gardeners, florists, grocers, and many others use it for baskets. It is a universal household friend furnished from the Orient. A novel application of the strands of rattan fiber is in reënforcing gypsum tiles to give them strength and make it practicable to nail them firmly into place. It is interesting and suggestive to recall that every cane seat in every chair in the United States comes from the opposite side of the world. We brought in 18,250,000 pounds in 1923, 10,800,000 pounds in 1924.

In what was said of coconut oil we did scant justice to a marvelous plant friend of man. The name of the Coconut Palm (*Cocos nucifera Palmæ*) ought to be recognized far and wide: it is the greatest vegetable benefactor that human beings as a whole possess. It provides food and drink, clothing and shelter, and materials besides for public and private service. The product of the tropics alone, it has spread its long arms of helpfulness throughout the temperate zones, entering into industrial and domestic life everywhere. We wash our hands with its aid, we eat it in cake, puddings, and candy, we cook with it; its loss would be a sad blow to bakers and confectioners. We wipe our dusty feet upon it, find it in our upholstery, make brushes from it, and feed it to cattle as food and to plants as fertilizer; of constant service in peace, it saves

the lives of our soldiers in war. Imagine a perpetual rain upon the ground of millions of coconuts daily. The trees are counted by hundreds of millions,[1] the annual crop of nuts by billions upon billions.

The home of the coconut palm is in the East. Our Western tropics, indeed, send us nuts in the shell from Panama, Trinidad, Jamaica, and their neighbors, but these are a trifle compared with the vast Eastern product — not over three per cent, if so much. Far the greatest part of the coconuts of the world pass through the copra stage into coconut oil with its residual oil cake. For the rest, the natives of Oriental islands know best how to avail themselves of this wonder-tree. We utilize the coarse fiber of husks as coir in mats, matting, and brushes. Florists pack plants with it, and in the war the charcoal made from the shells was the best absorbent in gas-masks and we hunted eagerly at home and abroad for all that could be had. But the native makes mats, ropes, and baskets as we do, and drinks the water of the green nuts, makes strong drink of it as well, and boils it down to sugar. The stems and buds are eaten, the leaves form

[1] In the Philippines alone, 51,302,395 in 1922, with a crop in 1923 of 1,515,253,000 nuts. Cf. *Trade in Philippine Copra and Coconut Oil*, by E. D. Gothwaite, Bureau of Foreign and Domestic Commerce, United States Department of Commerce, Trade Promotion Series 11, 1925, p. 23.

thatch, and the stems are worked into oars and posts, while the wood furnishes cabinet material and lumber for building and trim.[1] We use approximately 3000 tons of coir fiber annually, chiefly for matting, but it appears also in our homes in coarse whisk-brooms and scrubbing-brushes, and stands before the entrance of many houses as the modest but useful doormat.[2] 'It is,' says a large American manufacturer, 'a long jump from the coconut groves of India to the doorsteps of America, and yet that is the romantic story' of the unassuming doormat. For this purpose, he adds, the nuts are buried for almost a year in ponds or marshy fields before the natives tear off the outer husk that envelops the cocoa fiber. The nuts in this condition are beaten with wooden clubs until the fibers of the husk are loosened. These, after cleansing and grading, are spun by native women into yarn and baled for shipment to the United States. Behind so common, so humble an article as the mat on which we thoughtlessly tread, is a human story of toil in our behalf by men, women, and children beyond the seas.

[1] Cf. 'Coconut, Citizen of the Tropics,' by Otto Wilson, *Nature Magazine*, March, 1925.

[2] Statement of United States Department of Agriculture in their list of cordage fibers, by Lyster H. Dewey, botanist, May 19, 1922. *Dictionary of Tariff Information*, United States Tariff Commission, 1924, p. 140, gives coir importations in 1923 as fiber 3,281,600 pounds, yarn 3,189,418 pounds, a total a little in excess of 3200 net tons.

CHAPTER VIII

THE FREEDOM OF THE PRESS

'Beneath the diversity of political interests, within as well as among nations, has been woven a network of economic interdependence, weaker in some places, stronger in others, but still linking the prosperity of each to that of all.' [1]

A little over a century ago an enterprising papermaker of Western Massachusetts sent circulars to the housekeepers of his local community asking them to save rags that he might buy them to use as paper stock for his mill. From that day to this the business then begun has continued, but the women of the vicinage can no longer supply the material for the washers and the beaters. The pulp that flows to the great machines comes now from distant places. The story of the development of the paper industry is typical of that of the whole United States. Beginning with limited means and local initiative, it has expanded into an industry of national scope which reaches out its hands to the whole world for materials, and sends its products far and wide among the nations. It has al-

[1] Cf. *The Inter-Ally Debts and the United States,* National Industrial Conference Board, Inc., New York, 1925, Foreword, p. v.

ready outgrown our boundaries and become international. In it the chemist has wrought his work of alternate destruction and creation. Great areas in our land have been devastated to feed the voracious maws of our pulp and paper mills, and the call is ever for more, and yet more 'stock.' Slowly, far too slowly, the tree planter and the forester follow along the track laid waste for paper. Meanwhile, into a million homes, into many million hands, the printed word has gone, carrying for better or worse the products of that pen which is still believed, though perhaps to-day with more of hope than of assurance, to be mighty for the uplifting of men. Our national limits are found too restricted to contain our paper producers. The ceaseless clamor of the hungry presses is ever calling upon them and they have obeyed the call to follow the raw material, so that in a sense we have exported part of our paper industry because its demands were beyond our power to meet. Meanwhile, from those who remain at home the cry has gone out to all lands for the means wherewith to produce and live.

Mention has been made of the raw stock that came from all earth's seaports for making insulating paper. The item in our official statistics for 1924 that includes similar material tells of its coming from thirty-seven countries in Asia, Africa,

Europe, North and South America, and Australia.[1] But this, though large, is one of the lesser details. That other, which tells of waste paper and waste bagging imports for re-working into paper, is larger [2] and speaks of receipts from seventeen countries and five continents.

We pass to the old traditional paper stock of the boyhood of men now mature — rags. This class is more than double in weight the other two together. The imports under it come also from thirty-seven countries and aggregate over 250,000 tons a year, with Germany, France, and the Netherlands as foremost shippers. We note an outward movement from us of the same class of stock amounting to 60,000 tons, with Canada, Java, and Hongkong as leading recipients.[3]

Continuing our ascending scale for 1924 we look to wood pulp, and at once the barometer measuring the extent to which others minister to us rises with a jump. The aggregate imports of this material were 1,359,567 tons — over 26,000 tons a week [4] — and of this Canada sent us nearly half, 636,218 tons. Five other countries were actively interested.

[1] Cf. item 4699, p. 248, *Foreign Commerce and Navigation of the United States*, calendar year 1924, Bureau of Foreign and Domestic Commerce, United States Department of Commerce. Imports under this item in 1924, 96,115,238 pounds.

[2] Cf. *ibid.*, item 4692, 108,681,381 pounds.

[3] Cf. *ibid.*, p. 87, item 4699.

[4] Mechanical wood pulp was 219,571 tons of this total.

Sweden provided more unbleached sulphite pulp than Canada [1] and almost as much unbleached sulphate pulp (kraft pulp). Canada must be credited with 38,500 tons of pulpboard in rolls and, what is more important, with sending us in that year of 1924, 1,265,564 cords of pulpwood.

But these facts, though revealing and thought-provoking, are far from being the whole truth. It is the part others take in supplying us with the finished product that is most serious to American eyes. We received in 1924, for the compelling reason that we needed it, 1,370,588 tons of printing paper, 99 per cent of it standard newsprint.[2] This tonnage of finished paper is very nearly that given above for our receipts of wood pulp. The two together are 2,730,155 tons, equal to 52,500 tons weekly, and this omits pulpwood.

After this it is not necessary to review in detail our other paper imports. They are, indeed, considerable items, aggregating over a hundred million pounds annually, but they are not significant in comparison with the larger facts. As is well known, Canada sent us nearly 90 per cent of the imported newsprint, but Sweden, Germany, Finland, and Norway are considerable factors, and Newfound-

[1] Sweden, 226,978 tons, Canada, 192,308 tons unbleached sulphite; Sweden, 123,602 tons, Canada, 124,547 unbleached sulphate (kraft) pulp.

[2] Cf. *ibid.*, p. 248, items 4711, 4712.

land plays a respectable part. Our situation continues to develop along similar lines. The imports of pulpwood, wood pulp, and newsprint paper for the first nine months of 1925 show increases over the prior year of 22.2 per cent, 15.5 per cent, and 5.1 per cent respectively, and a further increase in paper receipts is promised by developments now under way. Meanwhile, there is also an increase of 15.8 per cent in the importations in 1925 of rags and paper stock other than wood pulp.[1]

There is no little significance in the statement made by a large paper producer in October, 1925, that at a price of $65 per ton for newsprint paper to contract customers in 1926 'many mills in the United States will . . . be unable to operate at a profit. This situation will be emphasized if Canada should further restrict or prohibit the exportation of her pulpwood.' But this American manufacturer, who operates some of his productive units in Canada, proceeds, 'With added low-cost capacity . . . which will soon raise our output [at one place] from 340 to 700 tons daily, together with the immediate construction of another equally efficient unit . . . we shall have ample capacity to care for all probable requirements on an expanding scale'; but, be it noted, from *without* the United States.

[1] Cf. *Our World Trade*, January–September, 1925, Foreign Commerce Department, Chamber of Commerce of the United States, p. 13.

A committee representing American pulp and paper manufacturers states that most of the timber in Canada is on Crown Lands and that pulpwood from this source cannot be exported, but must be made into pulp in Canada, leaving only a small proportion available for export to the United States. It declares that if the Canadian Government should stop the exportation of this limited amount of pulpwood, American paper-mill operators would be forced to move to Canada and that a result of the suggested embargo would be scarcity of paper and demoralization in the industry. The committee, however, asserts also that America is not wholly dependent on Canada for pulpwood, and that, if the embargo takes place, our mills will not shut down because supplies will be obtained from *other countries*. There could hardly be a more complete admission of dependence, coming as it does from those intimately, not to say painfully, familiar with the subject.[1]

Noting that Canadian mills have increased their output more than half in five years the following, from an official statement, is significant:

> The question of the domestic supply of newsprint paper is intimately connected with the Canadian newsprint industry . . . which in the last decade has been rapidly building up . . . while the American newsprint

[1] *New York Times*, December 21, 1925.

industry has been practically at a standstill. . . . It has been a natural outgrowth of the superior woodpulp resources of Canada.

The statement adds that Canada's industry grew at the expense of the United States by reason of the 'larger size and superior efficiency of Canadian paper-mill equipment.' It proceeds:

The pulpwood forests [of the United States] are rapidly diminishing and the demand for newsprint promises to remain firm. The increasing shortage of pulpwood in the United States and the Canadian embargoes on exports of Crown Land timber are causing a development of the Canadian newsprint industry at the expense of the American. Large new mills are being installed in Canada, largely by American capital. Some American newsprint mills are suspending operation.[1]

This was written three years ago and the tendencies shown have increased meanwhile. A recent writer, speaking of 1922, says:

Only 88 per cent of the paper we consumed that year was produced in the United States; only 60 per cent of the pulp used in making it was a home product; and only 49 per cent of the wood used in meeting paper requirements came from our own forests. . . . To-day [1924] more than half of the forest materials for all the paper used in the United States comes from outside our boundaries.[2]

[1] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Printing Paper,' revised edition, 1923, p. 2.

[2] Cf. article entitled 'Reforestation Needed to Save Advertising,' by James True, in *Printers' Ink Monthly*, November, 1924; also, *How*

It is of official record that the amount of pulp which we imported in 1923 was over one third the domestic production; and nearly one fourth of the latter was made from imported wood. These facts, say the Forest Service, afford an indication of the growing dependence of the United States on foreign sources.[1] The statement is made that in February, 1925, Canada for the first time made more newsprint paper than the United States. She certainly is on the way, with our help, to become the largest producer.[2] What can we do about it? It is rather late to ask the question. The answer is, develop resources yet unused (there are such), plant more, and use less if we can. If these prove insufficient, we may have to abate our self-sufficiency and admit our dependence on the world without. Our consumption of paper in 1922 was 8,000,000 tons, and our Forest Service forecasting the future of

the United States can Meet its Present and Future Pulp-Wood Requirements, by Earle H. Clapp and Charles W. Boyce, United States Department of Agriculture, Department Bulletin 1241, p. 13, prepared in coöperation with the American Paper and Pulp Association and the Committee on the Perpetuation of the Pulp and Paper Industry in the United States, July 29, 1924, a forceful and authoritative presentation of the subject in detail.

[1] Cf. *Pulpwood Consumption and Wood Pulp Production*, Bureau of the Census, United States Department of Commerce, in coöperation with the Forest Service, United States Department of Agriculture, 1925, p. 3. See also tables, pp. 7–15.

[2] October, 1925, was the fifth month of the present year in which Canada led the world in the production of newsprint. Output in October, 1925, Canada, 137,506 tons, United States, 135,225 tons. Cf. *New York Sun*, December 2, 1925.

our paper requirements says that a smaller growth than that of the last two decades would bring our consumption in ten years to more than 10,000,000 tons, and by 1950 to 13,500,000 tons.[1] It appears to be the case that we are about thirty years behind time in adopting a forest policy which will provide a solution for the problem. At present it is a simple and moderate statement of fact that 'the shortage of pulpwood [in the United States] is causing increasing dependence upon importations of pulp and pulpwood.'[2] The rapid growth of the rayon textile industry makes further demands upon our limited resources of pulpwood. If sniafil (artificial wool) develops, the drain will be again increased.

It is earnestly to be hoped that nothing will ever happen to delay or prevent the steady flow of Canadian supplies to United States newspapers. The great undefended frontier and over a hundred years of peace form happy auguries for the future. Still, one remembers that there have been acute differences between us and our northern friends involving at times seizures and other forceful methods. They will, let us hope and pray, never return, but never is a long, long time. Meanwhile,

[1] Cf. United States Department of Agriculture, Department Bulletin 1241, *supra*, p. 28.

[2] Cf. *Dictionary of Tariff Information*, United States Tariff Commission, 1924, p. 544, article 'Paper.'

the most ardent enthusiast must see that our dependence for newsprint and other paper and for paper stock on Canada is great and becoming greater. It would seem that considerate courtesy is indicated in public discussions of Canadian methods. We have been known to rejoice when our tariff wall brought foreign manufacturers hither as producers. How can we object if others follow an example we have set?

And here rises a chemical friend to say something hopeful:

> It would take [he says] 300 years to restore some of the wood we are now using, but much of it can be restored in much shorter time. A revolution is impending in the paper industry, because chemists have succeeded in making newsprint paper out of wood that can be cultivated like corn or potatoes — not as rapidly, but just as fast as the paper mills located on these wood plantations can use up the last of the first crop and get back to the first of the next crop.[1]

It is no secret that success has attended efforts to make newsprint paper out of soft, rapidly growing woods for which the soil and climate of our Southern States are favorable. Newspaper publishers and others who face a diminishing domestic supply of paper 'stock,' with all that is involved in future dependence on the control of their material by an-

[1] Cf. *What Price Progress*, by Hugh Farrell, The Chemical Foundation, Inc., New York, 1925, p. 50.

other political jurisdiction, will feel that they are under bonds to keep our relations with Canada cordial. They will also rejoice in any development that promises an enlarged domestic supply. Theirs is a prime duty, supported by strong direct interest, to see that productive forestry is made to prevail, that forest fires are made to cease, and that indifference to these vital matters is shown to be as unpatriotic as it is economically unsound. The fact is not forgotten that in our South and West far-seeing lumber manufacturers have adopted a wise policy of tree cultivation that promises to assure them a permanent supply of material. In several States, also, progressive steps have been taken to favor reforestation by tax laws and by direct encouragement of tree planting. Nevertheless, the people of the United States are not yet forest-minded. It is high time they became so. The shoe already begins to pinch on the newspaper foot and the pressure disturbs the makers of wall-papers: ere long it will concern these and others more seriously unless we turn ourselves mentally to the right-about and push with energy a policy which has waited too long for a widespread public opinion to support it.

The sovereignty of the United States over paper-making material for its mills has gone. 'Since 1909 the United States has ceased to be self-supporting

in newsprint paper.'[1] The most 'irreconcilable' editor must be content to have his editorials preaching political isolation printed on paper of Canadian origin. Even if we develop in our Southland large supplies of new material, they may be required to meet the threatened stoppage of Canadian pulpwood and the normal increase in our demands foreshadowed by our Government. A recent writer[2] says:

> With the immediate adoption of forestry measures there should be no difficulty in taking care immediately in the South alone of our present total dependence upon foreign countries for an equivalent of 773,000 cords of sulphate pulpwood and of the annual increase in our needs of 110,000 cords a year.

This would not counterbalance in volume a stoppage of our entire pulpwood supply from Canada were that event to happen, for our imports of wood are larger than that. It might set us free in certain respects, but would still leave a demand for newsprint which depends on a diminishing domestic supply and an increasing foreign one. At the best, with every favorable circumstance taken at the full and every unfavorable condition minimized,

[1] Cf. *Timber Depletion and the Answer*, United States Department of Agriculture, Department Circular 112, by William B. Greeley, Forester, June, 1920, p. 5.

[2] Cf. article by John D. Rue, of the United Forest Products Laboratory, entitled 'The Development of Pulp and Paper-Making in the South,' in the *Southern Lumberman*, December 20, 1924.

the situation which our printers, publishers, and paper-makers must face in the near future is such as to make them thoughtful. Those who knew the raw material situation during 1924 realized that our forests were being cut four times as fast as they grew and that little was being done to renew them. There was visible a seemingly plentiful supply of pulpwood, but the American manufacturer of paper had to face a diminishing home production of raw material and the possibility of Canadian legislation that might be adverse.[1] Another power, albeit a kindred and friendly one, has within its grasp, through its sea power and its possession of supplies, the control increasingly of the paper supply for our press and our publishing, and those who would ignore or conceal these facts are but blind leaders of the blind.

If we are to maintain our press free from foreign control of its vital supplies, we must do even more than adopt and carry out a far-seeing forest policy, for there is no time to lose. At present we are burning the candle at both ends, are wasting at both bung and spigot. There are two kinds of conservation, one which provides for use, another which conserves in use. The waste of paper-making materials in this country is huge, amounting to

[1] Cf. *The New International Year Book*, 1924, Dodd, Mead and Company, New York, 1925, article 'Paper,' pp. 555, 556.

thousands of tons daily. During the war active steps, under Government direction and in connection with local chambers of commerce throughout the country, resulted in great savings, some part at least of which appears to be permanent. Nevertheless, on every hand the waste continues and no economical means of controlling it are yet devised. Wherever old paper, rags, twine, cordage, and similar materials are burned, this waste appears. Wherever wood slabs, sawmill waste, chips, culls, and odd pieces of kinds from which paper can be made are burned in quantity, the waste goes on. On the other hand, it is a question newspaper publishers must answer whether it is necessary to have so-called evening editions on the street in our great cities before there has been time to sell the morning ones, and whether the great bulk of our Sunday newspapers is either necessary, desirable, or economically wise. However such questions may be answered, it needs no vision to see that the inexorable force of events will compel an adjustment to facts. New sources of material of adequate and renewable volume must be found, the prevailing waste must be diminished, or the existing uses must be controlled. One or all of these things must be done within a period that is not far distant or else economic law will have its way and we shall have only ourselves to blame for the consequences.

This is the truth concerning the major portion of the paper industry on which we depend for our printing paper. It is irrespective of the fact that in some special lines of fine paper-making of relatively limited output there is a sufficient supply, domestic and imported, of the particular materials they require. There are, of course, many fibers out of which paper can to some extent and at some cost be made. Years ago the Bureau of Standards produced paper in its own experimental mill from rice straw, banana stems, certain grasses, cotton linters, and the stalks of the cotton plant, as well as from bagasse, the crushed sugar cane. It is said also that paper material can be had from corn cobs, and perhaps from the stalks of corn now wasted in vast quantities. Whether these or any of them, or some fiber as yet undeveloped, will in whole or in part meet the future demands cannot now be said. They are not on the visible horizon of our actual resources. Their more or less hopeful possibilities do not alter the present duty to put forest protection and culture into fruitful practice, to save waste wherever it can be done, and to conserve in use wherever that may be practicable. This being done and well done, we may then be glad for such other resources as may be in the background, but for the present negligence there is no excuse for a people educated in self-government.

For one important factor in making 'coated' papers we look with confidence and success to the friendly Argentine cow. She provides us with casein and, with her sisters in Australasia and France, keeps us going. The domestic output of this important product of skimmed milk has been declining, though in 1923 it rose suddenly to more than half the importations (domestic supply, 15,548,000 pounds; [1] imports, 26,490,000 pounds). Our receipts from abroad fell off in 1924 to 17,750,000 pounds, of which Argentina supplied 16,600,000 pounds. This is a case where we waste tons of the raw material — skim milk — and then look to distant lands to help us.[2] There are many uses for casein. Coating paper takes most, but casein is in foods, medicines, colors, polishes, glue, paints, plastics, insecticides, photographic plates, and other things. On the whole, those friendly cows at the southward are very helpful to us. Then, there's karolith made in this country of casein and formed into toilet articles looking like celluloid, not so strong, but fireproof; and galalith, which comes in blocks, sheets, and rods from France and Germany.

[1] Cf. *Dictionary of Tariff Information*, United States Tariff Commission, 1924, p. 105.

[2] Cf. *Chemistry in Industry*, vol. II, chapter III, by George H. Brother, The Chemical Foundation, New York, October, 1925, pp. 37 *et seq.*; also *Tariff Information Surveys*, United States Tariff Commission, 'Lactarene or Casein,' revised edition, 1921, p. 18.

Another ingredient in paper for which we depend on a foreign supply is clay — the kaolin that is used in making china. It is one of those products of which we have a native supply that is widely used, but which we also import, not for lack of enough at home, but for reasons of real or supposed quality. In each of a series of studies of various phases of paper manufacture, our Tariff Commission states that for filling and coating paper some manufacturers prefer English china clay, saying that it is so far superior to the domestic clay as to be practically a different article.[1] It is widely used in book papers, tissue and hanging (wall) papers, and in some writing paper.

The same material is required by our potteries for making white earthenware and table china. In these kaolin is employed to the extent of approximately 40 per cent, and it appears that our producers rely on English china and ball clays to bring their wares up to the desired standards, since they regard these foreign clays as of unsurpassed quality.[2] The writer has observed in several do-

[1] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Printing Paper,' revised edition, 1923, pp. 7, 8. Also from same source, 'Wall Paper, etc.,' 1923, p. 6; 'Tissue Paper, etc.,' 1923, p. 4; 'Fine Paper and Envelopes,' 1923, p. 7; which says, 'practically a separate commodity.'

[2] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'The Pottery Industry,' revised edition, 1921, pp. 41, 45; also *ibid.*, 'Clays and Earths,' 1921, p. 12.

mestic plants large bins of American and English kaolins side by side. There was in every case a distinct difference in shade. The imported kaolin was snow-white, the domestic was darker. The manufacturers were friendly to the local product and used it continuously, but said they were obliged to have the imported also because of its excellence. The use of our local supply, however, has been gaining, and a study made by the Bureau of Standards of American and foreign clays as paper fillers showed both to be of substantially equal value for this purpose.[1] This report said, 'There are approximately from 200,000 to 300,000 tons of clay used annually in the paper industry of the United States. . . . The larger portion of this amount is of foreign source.'

Official statistics[2] show domestic kaolin, china clay, and paper clay sold in the United States in 1922 as 275,675 short tons, and the like material imported and entered for consumption in the same year as 310,136 tons. In 1923 the production of American kaolin rose to 336,803 tons and the imports to 311,298 tons.[3] Our foreign receipts in

[1] Cf. *Comparison of American and Foreign Clays as Paper Fillers*, by Merle B. Shaw and George W. Bicking, Technologic Paper 234 of the Bureau of Standards, vol. 18, p. 338.

[2] Cf. *Mineral Resources of the United States in 1922*, United States Geological Survey, Department of the Interior, 1925, Part II, pp. 74, 80.

[3] Cf. *New International Year Book*, 1924, Dodd, Mead and Company, New York, 1925, p. 165, article 'Clays.'

1924 were 315,437 tons.[1] It appears, therefore, that we bring from abroad an amount substantially equal to our own product, but few Americans have occasion to visualize the fact that we take from England 1000 tons of clay for every working day in the year. The 'Dictionary of Tariff Information' for 1924 (p. 117) states, however, that domestic clays might almost entirely replace foreign ones for certain purposes if greater care were given to the purifying and washing to remove impurities that would discolor finished goods and to make and keep the material standard in quality.

It is more interesting than comforting to observe that the product of American factories in the fine grades of china tableware have but a small place in the American market, since the high-grade European porcelains still have such vogue that the value of these imported goods is much greater than that of our own production. This is not wholly or justifiably because of finer quality, design, or decoration. The best domestic porcelain has of its kind no superior, and those familiar with it know that it is a product of which in every sense America may well be proud.[2] Our methods

[1] Information Letter no. 40 of the American Section, International Chamber of Commerce, dated Paris, April 17, 1925, states (p. 4) our takings of English china clay in 1924 as 331,000 tons, equal to half the English output at its peak.

[2] Cf. *supra*, 'The Pottery Industry,' p. 59.

of mass production have the weakness that they are not conducive to fine artistic results. The tendency is so strong toward the uniformity which promotes the lowest cost and largest sale that it often takes opportunity away from an individual talent which finds small room for expression in standardized wares. It is in a measure the price we pay for our high living standards and our high wage rates. Honor should be given the more to those American manufacturers who overcome this handicap and under adverse conditions develop artistic wares.

Many Americans would be incredulous if told that no American newspaper is printed without the help of China in sending us a material (antimony) which we cannot ourselves supply, but a little study of a modern printing office would open the eyes of any believer in our self-sufficiency. That liquid metal flowing through the type-casting machines — what is it? Type metal or stereotype metal, and linotype metal as well, are compounds of lead, antimony, and tin.[1] Both of the two last are necessary and neither is produced in America. An official statement reads, 'The United States has always been dependent mainly on foreign sources for its supplies of antimony.'[2] Mr. H. K.

[1] Cf. *A List of Alloys*, American Society for Testing Materials, 1922, pp. 23–25, etc.

[2] Cf. *Antimony in 1923*, by Frank C. Schrader, United States

Masters, Secretary of the New York Metal Exchange, says antimony is 'indispensable to modern civilization' and 'absolutely controlled by China.' He adds that it is vitally needed for making metal bearings and cooking utensils as well as type metal.[1] It is quite as necessary in the national defense, as we shall see hereafter.

The consumption is growing. Antimony is used in cheap domestic tableware, in toys, the tops of siphons, in battery plates, and in acid-resisting valves. It is a standard part of britannia metal. The oxides are in glass, enamels, paints, and in antique silver finish. The sulphides are of service in vulcanizing and coloring red rubber, and, when pulverized, in fireworks. Our native production in 1922 was twenty tons. In 1923 we obtained 2170 tons from smelting foreign and domestic antimonial lead ores. That same year we imported 8800 tons, three fourths of it from China.[2] In 1924 we received 8175 tons from abroad, of which 5830 came from China. It is interesting to speculate what the publishers and printers of the United States would do were the supply of this metal, so necessary but so little considered, to be cut off. Such an event

Geological Survey, Department of the Interior, published January 21, 1925, pp. 277, 288–91.

[1] Cf. *New York Times*, June 25, 1925.

[2] Cf. 'Antimony, etc.,' *Dictionary of Tariff Information*, United States Tariff Commission, 1924, pp. 36–37; also *Antimony in 1923*, *supra*, p. 287.

would annoy the telephone companies which use antimony as an alloy in the lead sheathing of cables. The American Telephone and Telegraph Company require 160,000 pounds each month for such purposes, and the New York–Chicago cable alone contains in its lead sheathing 215,000 pounds of antimony. This is, indeed, but one per cent of the lead used, but the cable cannot do without it. If antimony were not available, tin would serve, but three times as much would be needed and we have seen that there is no native American tin.

Not only the type which our printer uses, but the paper on which he prints, whether it be of rag stock or wood pulp or both, contains a large and growing element produced beyond our borders. If through war or embargo we were thrown back for a considerable period upon our own resources, printing presses would soon begin to stand idle. A very little lifting of the lid shows that the world relations which prevail in the telephone 'central' are reproduced in the modern printing office.

We may now consider briefly in conclusion the facts respecting printing inks. The subject is no sooner open than old acquaintances appear rendering important functions. Linseed oil, soy bean oil, and china wood oil are there. Chrome yellow and chrome green are among the colors and china clay appears once more. Gums turn up from far over-

seas, copal, damar, and kauri, and the salts of manganese and cobalt are concealed in the driers.[1] Some of these we have not as yet touched in our discussion but all of them are fetched from far either as a whole or to make good domestic shortages. When we turn to writing inks we find similar conditions, for here also the chemist has been busy. He has made the salts of chromium and vanadium useful as an addition to inks made from nutgalls which, according to origin, are called Aleppo, Turkey, Levant, or Chinese galls. Gum arabic or senegal and shellac are found desirable for certain uses, and both castor oil and china wood oil (tung oil) have their necessary places.[2] Galls, or nutgalls, or gall nuts contain pathological tannins. They are formed on plants after the sting of insects and the deposit of their eggs. The larvæ grow within the excrescence, pierce the shell and escape. We take the empty shell and utilize the tannic acid made from it for writing ink. The basic raw material, the nutgalls, are not produced in what the Tariff Commission calls 'significant amounts' in

[1] Cf. *The Composition, Properties and Testing of Printing Inks,* Circular 53, United States Bureau of Standards, March 29, 1915; also *Tariff Information Surveys,* United States Tariff Commission, 'Ink and Ink Powders,' revised edition, 1921, p. 98; and *Chemistry in Industry,* New York, October, 1925, vol. II, article 'The Chemistry of Inks,' by A. B. Davis, pp. 190–203.

[2] Cf. *supra,* 'Ink and Ink Powders,' and 'The Chemistry of Inks'; also United States Bureau of Standards Circular 95, March 5, 1925, *Inks, Typewriter Ribbons and Carbon Paper.*

the United States. So, they say, the industry has to depend on foreign supplies coming chiefly from Asia Minor and China.[1] These imported nutgalls are also used for making the tannic and gallic acid used in textile dyes and printing and in color making. A product of gallic acid, pyrogallic acid, is used in photographic developing, in medicine and as a reagent in chemical laboratories.[2] It may be said, therefore, with strict truth that these varied industries depend in some measure upon the continued activities of insects in China and Turkey. Our imports of nutgalls in 1923 were 3,945,000 pounds.

Before leaving the subject of the materials on which and with which we print and write a word may be said about carbon paper which has found of late years such increasing use. In its origin it goes back to paper stock of rags and wood pulp at the best, and manila fiber, jute, or ground wood at the worst. It takes us, however, into a region less familiar to tell of the use of carnauba wax and ceresin in coating it. The former is found on the leaves of a Brazilian palm and finds its way into many uses among us where it lies concealed.

[1] Cf. *Tariff Information Surveys*, United States Tariff Commission, *The Gallic, Pyrogallic and Tannic Acids Industry*, pp. 41 *et seq.*

[2] Nutgalls or gall nuts 'entered for consumption,' 1924, 1,813,559 pounds. Cf. also *Dictionary of Tariff Information*, 1924, United States Tariff Commission, article 'Tannic Acid, etc.,' under 'Acids,' p. 12; also article 'Nutgalls,' p. 513.

Among these are hard candles, leather polishes, and floor waxes, some varnishes, and phonograph records. Ceresin is a mineral wax found in Utah, Rumania, Argentina, and South Africa, which enters into wood fillers and floor polishes, shoe polish and, mixed with paraffin, into candles. Both these foreign waxes, one vegetable, one mineral, appear in carbon papers.

It matters not, therefore, whether press or pen or typewriter is used, we are beholden to the wide, wide world. Yet how many of us realize the wide-spread difficulties that would arise in our midst if Argentine cattle were to set up a lactic embargo or Asiatic insects were to go on strike. Could our entomologists provide a synthetic ink-bug or our zoölogists insure altruistic cows?

CHAPTER IX

THE WORLD IN THE HOME

We have still some distance to go before we reach the end of the road which the limits of this book will permit us to travel, but it may be well to pause to look about us a moment before proceeding. Our excursion into the world cannot cover it all either in the variety of commodities or the sweep of their geographical origins. A volume would be required for each of many great industries if the attempt were made to trace every material to its source. We must admit leaving undone much that ought to be done for an exhaustive treatment of our great theme. It *is* a great theme, nothing less than to trace in part the progress of the slowly developed but rapidly advancing forces that bind all men together whatever their race, color, customs, or habitat. This growing unification of men makes itself seen or felt now and then in public affairs, but ordinarily it shows there vaguely as through a mist, and is often lost to sight amid clouds of selfishness or of that narrow nationalism which too frequently is misunderstood to be patriotism. Strangely enough, however, this unifying force, which is seen but darkly amid the vapors of world

politics, has entered into and taken hold of every home and each soul in it, and will not let go. Its voice is very low as yet, almost unheard. Its presence is denied even by many who are the beneficiaries of its helpful service. It is repudiated by the loud speakers who voice a dying past, but it will not down. It is here: it will stay and expand until its presence is admitted and welcomed.

Even to-day in every city and hamlet of America men eat world food, wear world clothes, work with world materials, buy and sell in or with respect to world markets, and only in thought and in belated beliefs remain local. Some demur at the idea of world foods, but a glance at the facts will resolve doubts. World foods are of three kinds. There are those for which we are wholly dependent on other lands; cocoa and chocolate in all its forms, coffee, tea, bananas, spices, coconuts, tapioca, are examples. Second, those of which part of our supply is brought from abroad; sugar, turnips, beans, tomatoes, onions, lemons, grapefruit, pineapples, are examples. Finally, those whose prices are regulated by world conditions, though the domestic supply may be abundant; wheat and certain meats are examples. It is one of the indubitable but astonishing facts of to-day that every home, to him that hath eyes to see, is a world center. The fashion of short skirts in America seems purely a

personal and feminine thing, but in its reactions through hosiery it means a greater demand for growing mulberry trees in Japan, or through rayon for more wood pulp from Canada.

The woman at home turns to her sewing-basket and picks up a needle. The influence of that simple act, when multiplied by her millions of sisters all over this broad land, is felt in England and Germany. Let us ask an American needle manufacturer to explain. He says, 'It takes thirty-two operatives about six weeks to produce a hand needle and [they] must be people whose hands do not perspire.' He continues, 'All the hand needles that your wives and my wife are using at the present time are imported either from Germany or England.'[1] Our Government confirms him, saying of hand sewing, and darning needles, 'None are made in the United States.'[2] The wire for the finest grade of these needles is made by but one or two mills in England. The needles come from near Redditch, England, or Aix-la-Chapelle, Germany, which are the world centers of hand needle manufacture, although some are sent us from Czecho-Slovakia. It is necessary to think in millions in

[1] Statement of Francis E. Hamilton, representing the needle manufacturers of the United States, before the Committee on Ways and Means, House of Representatives, during hearings on Fordney Tariff Bill.

[2] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Needles,' revised edition, 1921, pp. 25, 36.

order to grasp the quantity of the hand and darning needles we receive annually, for the number will average over a billion a year.[1] Our own production of sewing and knitting machine needles is very large, but we import many millions of hand crochet, tape, and knitting needles of which England and Germany are the leading makers.[2] It is well to record that pins, hooks and eyes, snap-fasteners, and safety pins are often plated with tin from the Far East.

The relation between needles and fish-hooks is not obvious to the user, but it is real, nevertheless, for they come from the same factories in Worcestershire and are made from the same material. The identical quality of wire is used in both and the conditions of manufacture are in many ways alike. The chief foreign sources of supply for foreign fishing tackle are England and Norway and the American production is chiefly in the cheaper grades. In the manufacture of snelled hooks, silkworm gut is an important raw material which America does not produce. It comes from Spain.[3]

[1] In 1923, England, 764,589,000; Germany, 328,604,000; Czecho-Slovakia, 169,690,000. Total, 1,269,507,000.

In 1924, England, 563,460,000; Germany, 230,271,000; Czecho-Slovakia, 110,267,000. Total, 913,671,000.

[2] Cf. *Dictionary of Tariff Information*, United States Tariff Commission, 1924, p. 509.

[3] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Fishing Tackle,' revised edition, 1921, pp. 48–50.

In Hawthorne's 'Wonder-Book' there is a frisky, genial character called 'Quicksilver' who wears winged sandals like his prototype, Mercury, the messenger of the ancient gods. Hawthorne used little license in bringing this kindly character into his story, for he is a universal domestic friend. The master of the house compares the thermometer in his bedroom with that in the hall and tries to keep them both within moderate limits. He thinks often of his furnace dampers, but rarely of the mercury in the thermometers and still less of its disagreeable relatives. There are four members of that mercury family, one good, one less good, one bad, and one very bad. The good mercury is useful in barometers and thermometers and in amalgam to catch the gold and silver in stamp-mills. It has a place in the hat and fur industry, and in anti-fouling paint for ships' bottoms. Its brother is called calomel: nasty stuff with which we may be unpleasantly familiar. Then there is corrosive sublimate, masking under the apparently harmless name of bichloride, and useful within careful limits as an antiseptic, though a deadly poison.[1] The fourth group, comprising the very bad members of the family, is unfortunately the largest of all. They are warriors found in mixtures (fulminates)

[1] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Mercurial Preparations,' revised edition, 1921, p. 35.

for detonating explosives. In peace, indeed, the fighting member of the mercury family is useful, though there are substitutes for it; in war every Government uses it to fire the guns. No satisfactory substitute has ever been found for it in military service, and it is a valuable factor, to do it justice, in the production of all metals and in excavation and contracting work. Quite recently the vapor of quicksilver has been used to generate power, and a writer on the subject suggests that if the new mercury boiler should prove a success a large part of the quicksilver that would be needed for it will have to be sought in foreign countries.[1] We have a domestic supply of quicksilver, though our ores are low grade; their average metal content is less than half of one per cent. American reserves of ore are extensive, but greater ones are in Spain with a metal content of eight per cent or more. The deposits of Italy and Austria are at least twice as rich as our own.[2] Out of a world production in 1923 of 3219 metric tons, the United States made 270. Italy has been the great producer, furnishing half the world's output, and next to her, Spain, the two together supplying seven eighths of all.

[1] Cf. *Quicksilver in 1923*, by Clyde P. Ross, United States Geological Survey, Department of the Interior, September 29, 1924, pp. 35, 40.

[2] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Quicksilver,' revised edition, 1921, p. 7.

Recently our American output has increased, but we still import much more than we make.[1] This liquid metal in its more kindly phases is used for silvering mirrors and for dental amalgam, for vapor lamps and cosmetics, for boiler compounds, and recently has been adapted to the control of temperature in industrial chemical plants. It is one of a number of commodities whose usefulness is expanding, but of which our native supply is inadequate.

An old lady kept in her closet a private cork box into which she garnered all the vagrant corks about the house, for she was annoyed when needing a bottle to find it corkless and to her, therefore, useless. She had no idea of the origin of cork or of the form in which it came. One day a truck passed through the street before her house piled high with bales of cork bark. It was before the days of motors and the two horses looked to her pitifully small compared with the huge load they were drawing. She called her nephew and urged him to protest on behalf of the poor, overladen beasts, as she supposed them. It took time to convince her that the bulk was deceptive and the load light.

[1] Domestic production, 1924: 754,575 pounds based on 10,061 flasks of 75 pounds each. Imports in same year, 905,678 pounds; in 1923, 1,568,551 pounds. Cf. *The Mineral Industry during 1924*, vol. XXXIII, pp. 632–35. Nearly two thirds of this came from Italy and more from Spain and Mexico and through England.

Cork is the bark of an evergreen oak indigenous to Southern Europe and Northern Africa, and the best grades are said to come from mountainous areas where the rainfall is light and the soil poor. The bark is taken from the trees at intervals of nine years and, despite this harsh treatment, the trees live to be several centuries old.

Every one uses cork: not, indeed, to the extent common of old, but still often and in variety. It runs a gamut from lining metal 'crowns' to filling life-preservers. It supports the fisherman's net and forms the tip of cigarettes. It insulates refrigerators and lines shoes; it is in floor tiles and linoleum and none of it is original in our land. Says our Tariff Commission, 'Lacking a native supply, all the bark used in the domestic cork industry is imported . . . No cork for industrial purposes is grown in the United States.' [1] We have tried to grow it for a long time, but thus far without effect on the supply. Of course, we have wood and glass and rubber bottle stoppers, but cork continues on its undisturbed career, for no satisfactory substitute is known for this alien bark. Light as it is, our imports are heavy: they run up to scores of thousands of tons each year. It comes in many forms and with separate classifications in our official

[1] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Cork,' revised edition, 1921, pp. 7, 8.

records. The largest group of imports is cork waste and shavings, of which we took 65,000 net tons in 1924 from Portugal (half of it), Spain and Algeria, with Tunis. Next was cork bark: 31,200 tons from the same countries, adding France, but of this bark Algeria sent us more than Spain. Then there were over 9400 net tons of cork insulation, almost wholly from Spain, and some scattering cork manufactures to the extent of over 2500 tons, most of them Spanish, but with Germany having a share. Altogether, that is a good deal of cork, well over 109,000 net tons (and big, bulky tons they are) of a material of which we say, 'light as a cork.'

In mother's button bag (if mother has one as her mother did) you will surely find some vegetable ivory buttons, known and admired of all men's and women's tailors. This product of the tagua nut can be made into any style of button and dyed to match any color. It is the well-known favorite for women's suits and coats of the better grades and for men's clothing. The ivory palm of which this tagua nut is the fruit grows in but one limited area, and that is far, far away from any button shop or factory. The tree is as queer as its habitat is exclusive. It is a crook — literally — and perhaps for that reason has received a bad name in punishment, *Phytelephas Macrocarpa.* It deserves it, although we try to make it easier by saying 'ivory

palm.' For even the books abuse the tree, calling it an 'aberrant.' It surely is. Instead of standing up straight on its roots as all good trees do, this one crawls on the ground like a snake. After twenty feet of this it turns up to the light, but not for long, about six feet. Then it shoots out leaves twenty feet long and that's all except nuts. The nuts come in drupes or enclosures called 'negroes' heads.' Each nut is about the size of a hen's egg and when green is filled with liquid. This hardens slowly till the nut ripens when it has become a white mass which is the hardest albumen known. It can be sawn or sliced and will take a high polish. The tree grows in Southern Panama, Colombia, Ecuador, and Peru. You will find it at home in the Magdalena River Valley, and we use millions and millions of buttons made from its nuts. They are probably on your overcoat or your wife's wrap. When we bring in only 13,000 tons of tagua nuts in a year, it's a poor year. It has run as high as 24,000 tons (1920) and we import some vegetable ivory buttons also. Then, of course, there are buttons of other materials; rubber, for instance, for naval uniforms, agate from France, and composition buttons with Indian shellac used in making them, and sometimes pearl buttons from Japan and the Philippines, though the best of these are domestic. Taken as a whole, the contents

of grandmother's button bag were a world product.

Grandmother had visited in a beautiful home in Tokio where the ceiling of the drawing-room was decorated by open folding fans fixed in squares formed by the crossings of polished beams. Each square contained one large fan which was the work of an individual artist and, though all were beautifully harmonious, no two were alike. She had no leaning toward the common garden variety of palm-leaf fans, of which so many thousand dozen come every year from China, but a fan that was a work of art appealed to her sense of beauty and of usefulness. Her tastes were cosmopolitan. Some fans were made at home; some were from Paris and Vienna, and she knew her Spanish sisters were adepts in their use. Folding fans are a Japanese invention. Beautiful ones are produced here, but our makers 'depend almost entirely on the importation of fan-sticks, fabrics, laces, feathers, and spangles used in their industry,' and these we bring from Japan, France, Austria, and Germany. Fashion is a controlling power in fans as in much else and there is always a demand in America for fine French fans. Those of the higher grades from Eastern Asia cannot be successfully made here.[1]

[1] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Fans,' revised edition, 1921, pp. 7–9.

The old house had never been fully wired for electricity and gas mantles were in use. It was easy to get them from the hardware store 'uptown,' but no one gave a thought to their life-story. On the sea beach of the States of Bahia and Espirito Santo in Brazil monazite sands are found from which the rare metals thorium and cerium are obtained. Recently, similar sands from the beach placers of Travancore in Southwestern India have replaced the Brazilian ones. Such sands are found in North and South Carolina, but there are no records of any domestic production since 1917. Thorium, with a little cerium, has been used in gas mantles, but apparently the competition of electric light has diminished the demand. A small amount of thorium is alloyed with tungsten in making filaments for electric lamps and similar filaments in radio apparatus. Cerium is the basis for automatic gas and cigar lighters; some of its compounds have been used in glass and ceramic manufacture, in tanning, dyeing, and in medicine. The demand has fallen off in recent years and such supply as is now required comes from the shores of the Indian Ocean.[1] The incandescent mantle is a naturalized alien.

[1] Cf. 'Monazite and Thorium Minerals,' *Non-Metallic Minerals*, by Raymond B. Ladoo, McGraw-Hill Book Company, New York, 1925, p. 392.

Cf. *The Incandescent Gas Mantle Industry*, Tariff Information Series

These actual domestic incidents concerning cork, fans, and gas mantles lead us to ask if an American citizen cannot have a quiet, 'home' smoke under his own vine and fig tree without the interference of the wide, wide world. Yes, of course, if he will surrender some of his sovereignty and agree to certain reservations. He must eschew Cuban tobacco and such as comes from Turkey, Egypt, Greece, the Philippines, or the Netherlands Indies. Self-denial would be necessary in certain auxiliaries, briar wood and meerschaum pipes among them, and amber, ivory, and hard-rubber mouthpieces. Of course, any cigarettes that use French paper would be taboo. With such exceptions the patriotic smoker may use the fragrant weed to his heart's content. In a report on 'Pipes and Smokers' Articles' our Tariff Commission says, 'The American manufacturer is practically entirely dependent upon imports of raw materials.'[1] Briar root or wood comes from the burl or base of the white or tree heath (*Erica arborea*) native to Italy and Algeria.[2] Meerschaum (sea-foam) is an opaque

14, United States Tariff Commission, 1920; also, *Tariff Information Surveys*, United States Tariff Commission, 'Incandescent Gas Mantle Industry,' revised edition, 1921; and article 'Monazite,' in *The Mineral Industry during 1924*, vol. XXXIII, McGraw-Hill Book Company, New York, p. 501.

[1] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Pipes and Smokers' Articles,' revised edition, 1921, p. 9.

[2] Cf. *ibid.*, p. 20. Imports, 1924, 4,092,856 pounds (of which France, 3,234,112 pounds, Italy, 629,839 pounds, Algeria-Tunis, 133,726 pounds).

mineral which is a native of Asia Minor (Anatolia) where it is said to have been mined for two thousand years. It reaches us through Vienna.[1] The use of it for pipes began in Budapest as recently as 1723: we do not know what the old Greeks did with it. Amber, a fossil gum, is a child of the Baltic and is obtained from East Prussia. France has had a monopoly of cigarette paper and most of it still comes from there — 10,760,000 pounds in 1924.[2] The world will intrude itself even into a quiet smoke, and why not, when it adds to our comfort? But let him that smokes give grateful heed to those who render him service in lands across the sea.

Having entered the intimate area of personal habits it cannot be left without reference to one that has features of peculiar interest. When boys in New England wander in the woods, so far as woods remain in which to wander, they doubtless still pick gum from such spruce trees as hungry paper-mills have permitted to survive. The writer can testify that spruce gum so obtained in a state of nature has its merits. It has risen now to such a dignity that great governments reckon with it in tariff schedules, for it is still brought to us from Canada to a limited extent for the same purpose

[1] Cf. *ibid.*, p. 17; also article 'Meerschaum-Sepiolite,' in *Non-Metallic Minerals*, Raymond B. Ladoo, McGraw-Hill Book Company, New York, p. 343.

[2] Cf. *supra*, p. 10.

as of old. But Mexico has interfered and they chew chicle who now chew gum. Chicle is the coagulated latex or milk of the *Achas sapota*, a large tree native to the American tropics. When it has hardened in the air the crude material is put into jute bags — thus combining Asia and America — and shipped to the United States. Every one knows what happens then. *Si quæris circumspice.* But, if tempted to be scornful, be not too scornful, for great governments recognize the value of chewing gum. It may be said to participate in the national defense. Our War Department supplied it in large quantities to the American troops in France for its value in relaxing thirst on marches. It was popular among the war workers in British industry and in the trenches of France. Nor can it be despised as an economic factor; there's too much of it. We took nearly 8,000,000 pounds in 1924 and more the year earlier. Most came from Mexico (5,626,000 pounds), but some from British Honduras (1,463,000 pounds), from Guatemala, Venezuela, and Honduras. Whatever social or physical value chicle has — if it has any — and all its business value are based on supplies 'derived entirely from foreign sources.'

The reader who may have followed our discussion thus far must have noticed the omission to touch, other than by occasional reference, on cer-

tain essential imported commodities for which we are almost or altogether dependent on foreign supplies and which it would not be an overstatement to call the great import groups. In this chapter, which covers especially the relations of our home life to the world life, it is well to speak of these. For tea, coffee, cocoa and its products, and for some fruits, as bananas, we are wholly dependent on other countries and every one knows it. They know it so well that whenever the subject of our need of imports arises, it is these that spring naturally before the mind. It is for this very reason and for the further cause that they hold a disproportionate place in the average estimate of our relations to the world that so little detailed attention has now been given them. We need them all, we use them all in enormous quantities, but we could better do without them all than without other commodities of which we think less. Deprivation of any of the four would hardly be as upsetting as would be the loss of jute. Their absence would cause serious discomfort; it would not necessarily mean disaster. Sugar occupies a rather different place both as to its importance and production. We produce much on our own soil and much also in our insular possessions, and Cuba is as it were a near relative in our family life. The Queen of the Antilles is a definite and essential factor of our

economic existence. We draw from her, not only sugar and molasses, but great quantities of fruit, iron ore, copper ore and concentrates, tobacco, hides, and other materials, mineral and vegetable, to some of which reference has already been made. An embargo on Cuban products is hardly thinkable: it would cause distress throughout the United States and would be calamitous to Cuba.

In a peculiar sense the radio is the world in the home. It catches the silent music in the air and makes it audible. It multiplies the single voice till it may be heard of all men far and near. It promises to speak to the nations and to be the first means whereby mankind may simultaneously learn that which may concern them all. But before it can thus talk to all men and that it may do so, there have been gathered into it the results of almost universal toil. Like its relatives, the telephone and the electric lamp, it is a world product. No one nation could produce it: none has attempted to do so.

In one standard receiving set are two thousand different parts, omitting the tubes. Each of the seven tubes has thirty-two parts. The list of materials entering into these is a lesson in physical geography, for the continents are there, the shores, the plains, the hills and islands appear, and the animal, vegetable, and mineral kingdoms. Black

men, white men, yellow men, brown men, are collecting to-day materials all over the earth for the radio of to-morrow. They seek for tungsten and for thorium, for nickel, platinum, and iridium; magnesium is sought, and iron, copper, tin, mica, aluminum, silver, steel, chromium, lead, zinc, manganese. Rubber is needed and porcelain, brass and bronze, bakelite and enamel, glass, silk and cotton, varnish and paraffin paper, and carbon, wood and asphalt, and finally asbestos. We need not now attempt to trace all these materials to their sources, but may note that it is said that the ingredients comprising a radio set have among them all traveled 250,000 miles between their places of origin and the factory where they are finally combined. Many of these we have already discussed. Some of them are domestic, many are foreign. No nation, no continent, supplies them all. The radio reaches quite as far for its constituent elements as the waves flow which it transmutes into melody or speech.

CHAPTER X

A NUMBER OF THINGS

In an old building of downtown New York the fireplaces are decorated with the national arms showing but seventeen stars. One passes up a branching staircase under the original figurehead of the old clipper ship, Glory of the Seas, into a room that imposes its quiet influence on all who enter. The visitor sees harmony of line and furnishings, but this does not fully explain the tranquil atmosphere. The charm lies in the combination of these with coloring that is reposeful and, if one may so speak, 'gentle.' The whole effect is as if the room said, 'Here you will rest.' In that place the color problem has been treated by a master with such magic that even a casual caller feels the spell. Behind the brain and hand of the local artist were the thought and labor of a world.

It is refreshing to find a writer on paints, varnishes, and colors saying that there are 'over a thousand materials coming from all parts of the world with which the [paint or color] chemist must be familiar in order to have a thorough knowledge upon which to base his processes.' [1] To this an-

[1] Cf. *Chemistry in Industry*, vol. II, chapter XIV, 'Paints, Varnishes and Colors,' by Henry A. Gardner, The Chemical Foundation, New York, October, 1925, p. 232 *et seq.*

other adds, 'There is scarcely any quarter of the globe to which some portion of the paint can or its contents does not return home.' [1]

The story of colors is an ancient tale; in Egypt they have endured four thousand years. Old Pompeii lent its name to a color, and many cities and countries have done it since, so that the list is like a roster of past and present ages. Even the names of great artists are used, Van Dyke, Rembrandt, and Veronese. The heavens contribute Cerulean Blue and Mars Red. Here is a world-wide, time-long area of artistic, historical, and geographical interest. We must, indeed, not forget that many of these apparent aliens are indigenous to our soil, older Americans than those who use them, yet the whole subject of protective coatings is tinctured with international life. It respects the customs of the dead past and embodies the science of a living present. The advertisement was right which said, 'It covers the earth.' Confidence is created in the future of a great industry when its men of light and leading cherish no delusions of self-sufficiency and recognize that isolation is a dream.

[1] Cf. 'The Materials of Paint Manufacture,' address by G. B. Heckel before the Section of Physics and Chemistry at Franklin Institute, Philadelphia. Reprinted from the *Journal of Franklin Institute* for June, 1911, and published by the Education Bureau, Paint Manufacturers' Association of the United States, Philadelphia.

Having before us, therefore, authoritative statements of the universal character of the paint, varnish, and color industries, it suffices to give illustrations from current affairs which will make this clear, for the man would be more than well-informed who, looking about his house within and without, could know whence the materials came that he sees about him. It is interesting and it now seems normal to find world relations existing in paint, varnish, and color like those which have been found in steel, leather, paper, and wool. A large mass of good domestic materials is variously and widely employed and, side by side with these, making their use possible, are materials from other countries without which the industries would be crippled. It would embarrass every painter in America if we had to depend upon such supplies of linseed oil and China wood oil as the United States alone can now furnish. It would be quite as serious if for chromium colors and compounds and for manganese we had to fall back upon our own meager resources. We produce white lead, red lead, and many pigments and powders of the best quality, but just as we supplement our domestic oils with others so we look to the outer world for pigments which either are not found at home or of which the domestic supply is inferior or insufficient. Among these are some of the ochres and the umbers

and siennas. About two thirds of the ochres used are domestic, but we get the superior ones from France which is the world's greatest producer of them. Greater care in the production of this domestic material would result in a larger use of it, as with kaolin, but the high cost of our labor makes it difficult to do the required cleansing within the necessary price limits.

Umbers come to us from the island of Cyprus and sienna earths, as the name would imply, are of Italian origin. It was stated to the Sixtieth Congress that American umbers and siennas are of low grade and not suitable for making paints. Italian (Tuscany) sienna and Turkish (Cyprus) umber were said to be 'standard colors throughout the civilized world.' [1] The principal use of both is in paint, but sienna enters into printing inks, artists' colors, and stains. Umber, though used by artists and for wall papers, is especially required for weather-proof paints. Neither is found in available quantities in the United States.[2] The official records of imports of these materials are confused, but we received in 1924 from twelve countries over 48,000 net tons of mineral earth pigments. They came, in order of quantities, from France, Bel-

[1] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Ochres and Ochery Earths,' second revised edition, 1922, pp. 65–77.

[2] Cf. *ibid.*, p. 80.

gium, Spain, England, Cyprus, Denmark, and Italy.[1]

The industries related to the world of color have laid under tribute the animal, vegetable, and mineral kingdoms and use all things therein which promote the services they render. The painter has few better friends than the lac-bug; the vegetables of the Carboniferous era assist him with colors from coal; the fossil gums of ancient forests of the Antipodes are useful to him and so are the products of living trees at home. The chalk cliffs of England are his allies and the flax farmers of Argentina are his support. Canadian cobalt is a friend which we have met before. The man imagined as examining the paint about his house may find on his dining-table china which shows in its blue decoration the presence of this metal. It may also be there in that 'stainless steel,' which is not steel at all. Mixed as a salt with oil it may be hidden as a drier in the paint or varnish or be in the kitchen as a constituent of blue enamel. All the cobalt that we use is imported.[2] We took 206,000 pounds of the ore and metal in 1924, a little of it from Australia, and 225,000 pounds of the oxide from Co-

[1] Separate details of ochre, umber, and sienna imports for 1923 and before are given in the *Dictionary of Tariff Information,* United States Tariff Commission, 1924, p. 515.

[2] Cf. 'Rare Metals,' by Frank L. Hess, *Mineral Resources of the United States,* 1923, Part I, United States Geological Survey, Department of the Interior, November 29, 1924, p. 235.

balt, Ontario,[1] where the ore is associated in the silver ores.

In enamels (used to protect metal or as glazes on china) the oxides of tin, cobalt, manganese, and chromium are combined with kaolin and glass-making elements (flint, fluorspar, feldspar, etc.) to form one more compact example of a world united in service.[2]

Linseed oil is the chief pigment carrier, but there are others. Perilla oil has been extensively used as a drying oil and is said to be superior. It is the product obtained from the seeds of a plant native to Eastern Asia where the oil is extracted for edible purposes as well as to replace other oils. In 1923 we imported more than 6,400,000 pounds of this oil, which has been found so valuable that we have been trying to cultivate the plant here.

Chalk (whiting and Paris white) is a material of which the world's largest and best supply is found on the shores of the English Channel — the white cliffs of Dover or those which face them from France. It has a wide range of uses, entering into crayons, paints, pastel colors, tooth powders, medicine, polishes, putty, calcimine, linoleum, and

[1] Cf. As to use of cobalt in magnet steel, etc., *The Mineral Industry during 1924*, vol. xxxiii, McGraw-Hill Book Company, New York, 1925, pp. 164–67.

[2] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Fusible Enamels,' second revised edition, 1922, pp. 186–88.

rubber goods. No domestic supply of good grade is available and we, therefore, get from abroad nearly all our crude chalk and some that is manufactured. Of the first in 1924 we received 107,000 tons (60,000 from England, 41,000 from France). The second entered to the amount of 16,700,000 pounds, about two thirds from Belgium.

On entering the field of varnishes a new world opens. The old acquaintances, linseed oil and tung oil, are again present, and as before we find large domestic supplies and essential factors which we cannot produce. Once more familiar names occur, shellac, amber, gutta-percha, rubber — and a home product, rosin, holds an important place. Others, as kauri, damar, copal, sandarac, and their fellows, are new and they bring up the subject of the numerous gums (resins) we use. The flow of materials from the distant East shows that our varnish industry is the largest of its kind. Nearly half of the lac, the kauri, the copal, and damar, sent respectively from India, New Zealand, Dutch Insulinde, and Malaya, comes to us. Synthetic resins, indeed, there are, made from coal-tar distillates, but little as yet indicates that we shall cease to depend upon the many resins that come to us from the other hemisphere.[1]

[1] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Varnishes,' second revised edition, 1922, p. 134.

Our Tariff Commission is responsible for saying that our entire supply of kauri, copal, and damar is imported. The names are class names, not specific ones, and not exact. There are many copals, a group of damars, and but one kauri, though this is also called kauri copal. The commercial and the botanical nomenclature do not agree, for the latter has a precise origin and the former 'jes' growed' like Topsy. Similar cases are found in our fisheries of local terms having no relation to the scientific names of the fishes to which they apply. A housekeeper, moving from Boston to New York and then to Baltimore, would buy the same fish under a different name in the markets of each city. Gum copal and kauri gum are both fossil and raw (recent); amber gum is always fossil. Damar is taken from living trees.

Kauri is as distinctive of the northern island of New Zealand as wattle is of Natal and more so than cotton is of our Southern States. Unlike these, however, this vegetable gum is mined, taken out of trenches or 'face diggings' from under ground. There are living kauri trees in the limited area which is its home, but the best gum is the fossil resin left from ancient forests. To find it the diggers were accustomed to prospect with thin gum-spears as long as sixteen feet with which they prodded in the earth to feel the lumps. Excavating

is now done more effectively under the general supervision of an official kauri gum superintendent. Few of us fail to use this survivor of forgotten forests, for its service in paints, japans, and varnish is extensive and it is a valuable ingredient even when the product is made chiefly of other materials. We brought in almost 6,000,000 pounds in 1924 and more in each of the two earlier years.[1] Our imports of damar in 1924 were 9,600,000 pounds, almost wholly from the Dutch Indies and Straits Settlements. Copals (hard, medium, and soft) are not separately reported in our records, but are included in 'all other' varnish gums and resins, of which 27,820,000 pounds were received from nineteen countries, including those just named, and Zanzibar, the Philippines, the Belgian Kongo, Siam, and India.[2] Both damars and copals — the names are loosely applied — are widely utilized in varnishes, enamel paints, and linoleum.[3]

These copal gums, which form so necessary an element in the processes of an American industry,

[1] In 1923, 8,915,337 pounds; 1922, 9,321,888 pounds. Cf. *Dictionary of Tariff Information*, United States Tariff Commission, 1924, p. 386.

[2] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Copals, Shellac, and Other Varnish Gums,' etc., revised edition, 1921, pp. 7–9, 15.

[3] Cf. articles on 'Fossil Gums, Kauri, and Copal Gum,' by W. M. Myers, in *Chemical and Metallurgical Engineering*, October 20, 27, November 3, 1924; also *Damar and Copal*, Malayan Series, XIX, printed for the Malayan Governments by Fraser and Neave, Ltd., Singapore, 1923.

form also a curious link between civilized and savage man. They are gathered by natives in the almost unexplored interiors of remote lands so that little is known in detail about their production. The fossil kinds are dug up from small excavations made often with the crudest tools, sometimes a coconut shell: the 'bush' variety is gathered from rough incisions hacked in the roots or trunks of trees. They come out of the jungle into the world of commerce through Chinese traders. A gum called 'pontianak' is found in Borneo, but the actual method of gathering it is unknown. Sandarac gum comes from an evergreen tree of Northwest Africa for use in varnish and by dentists. Tragacanth, used in crêpes and calicoes and for marbling book edges, reaches us from Persia, Kurdistan, and other parts of Western Asia.

The steamers from Nagasaki to Manila pass close to the eastern shore of Formosa, and that portion of the trip, if taken by day, is full of interest. Our maps are on such a scale that we do not readily grasp the size of the island, but it is there on the starboard side at dawn and nightfall conceals its mountains from the sight. It is a stern, forbidding coast, the high peaks piercing the clouds, and its southern reaches give little sign of habitation. It was natural to reflect, when seeing it, on the difficult task the Japanese had to bring

the fierce natives of this wild country under civilized control. It might be called a part of the 'yellow man's burden,' but, though he bore it alone, the supply of camphor for the whole world was involved. Even after the Japanese army had broken down the resistance of the savages, a large police force was required to give the camphor industry security. Since that time the cultivation of camphor has extended into the southern islands of Japan itself and savages are no longer a menace. The production of camphor by distillation from the wood of the evergreen camphor tree is a Japanese Government monopoly. A limited amount, indeed, but one that is 'insignificant as compared with imports,' is produced in Florida; [1] the records of 1924 show imports of 4,700,000 pounds of which nearly two thirds was refined camphor. It is one of those foreign products which is everywhere known. More than half of it is found in celluloid. It is a factor in pyroxylin and its allies and in photographic films. In various forms it appears in the medicine closet and the American moth views it with high displeasure.

America knows gum arabic well, but Arabia knows it not at all. So Peruvian bark is a familiar name to the people of the United States, but its

[1] Cf. *Tariff Information Surveys*, United States Tariff Commission 'Camphor,' revised edition, 1921, p. 63 *et seq.*

present origin is thousands of miles from Peru, and the balsam known as 'Peru balsam' comes from Salvador. Gum arabic exudes from small, thorny acacia trees in Northern and Central Africa. It is collected during the autumn in Lower Egypt, Kordofan, and the Sudan, and brought by caravans into Egypt whence it is shipped directly to us.[1] The poorer grades are used in inks. The gum has value for sizing silks and laces, for calico printing, and as an ingredient of some water-colors and water-paints. It is important as an adhesive, enters into confectionery, and the best quality is recognized in pharmacy.

What can be the mental processes, if there are any, that are excited to action in the brain of an advocate of our self-sufficiency on entering a drug-store? If the eyes of his mind are open so that he has any knowledge of origins, he must leave at once, regretful that he should have entered such an international place. He must be doubly distressed if there is illness at home lest the doctor prescribe some alien medicine. How it would upset medical practice if such a slogan as 'American drugs for American doctors' were strictly applied! Like other things, some medicines are domestic, and many foreign. The outlanders, indeed, are so

[1] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Gum Arabic or Senegal,' revised edition, 1921, pp. 52–62.

numerous that there is a series of Government pamphlets telling about them.[1] A manufacturing pharmacist advertises that 'the difficulty of transporting huge panniers of crude drugs across the towering Andes or along the winding Amazon is but one detail in . . . securing . . . materials found in their best form on the South American continent,' and speaks of cinchona, ipecac, capsicum, and others as peculiar to this region. Another advertiser points out the fact that Java is the chief producer of quinine in the world. Quinine has been a great traveler. The bark of the cinchona tree which was found useful as medicine in the early eighteenth century came at first from Northwestern South America, chiefly Peru, whence the name 'Peruvian bark.' The methods of production were so ignorant and, therefore, wasteful that in 1854 the tree was taken to Java and there put under cultivation.[2] The industry is now a Dutch Government monopoly through control of almost the

[1] Cf. Tariff Information Series 19, United States Tariff Commission, *The Crude Botanical Drug Industry*, 1920; *Quinine, Production and Marketing*, by Samuel H. Cross, Trade Information Bulletin 273, Chemical Division, Bureau of Foreign and Domestic Commerce, United States Department of Commerce, 1924; *Tariff Information Surveys*, United States Tariff Commission, 'The Crude Botanical Drug Industry, Ergot, Ethers and Esters,' 'Drugs Exempt from Duty,' 'Medicinals, Chlorine Products, Pyroxylin Plastics,' and 'Buchu Leaves, Coca Leaves, Gentian, Licorice Root, etc.,' revised editions, 1921.

[2] Cf. *Quinine, Production and Marketing, supra*, p. 1.

entire production which enters the international quinine market and for quinine and its associated drugs the world has now to look to the Netherlands Indies. The story is one to which Americans may well give heed. An abundant natural supply was so negligently treated that at last men were found who would substitute knowledge for ignorance and culture for carelessness, with the result that a material of world-wide use was taken away from its natural home and transported to the other side of the earth, whence to-day it comes.

It would make our pages read like a catalogue if we were to recite the names of all the drugs for which we look to other lands, and it is sufficient to say there is hardly a country which fails to furnish some commercial medicinal supply of which only a few more of the principal ones may be mentioned. Medicinal opium (morphine) is chiefly produced in Asiatic Turkey and Persia; coca leaves and cocaine are brought from Peru and large plantations are being developed in Java. Licorice root, the largest drug import, 90 per cent of which is used for flavoring plug tobacco, is obtained from Asia Minor, and licorice paste from Spain. Ergot comes from the rye-fields of Spain and Russia; gentian is a wild product of the mountains of Southern Europe. Sarsaparilla is the root of wild

vines in tropical America. The comment is made in a pamphlet on the subject that 'it may be but is seldom used in the "sarsaparilla" soft drinks.' [1] Buchu leaves are a product of British South Africa; nux vomica comes from the seed of a tree indigenous to India and Cochin-China; ipecac is a root brought from Colombia, Panama, and Brazil, and rhubarb another root from China.[2]

The production of domestic drugs of every kind, both by natural and chemical processes, is a development in which our country may take just pride and the cultivation of exotic plants in the United States has had a fair measure of success. The case of ginseng is interesting because this native plant formerly grew wild in many parts of the United States. It was almost extirpated by intensive collecting and is now cultivated, though the wild root is preferred. The entire output goes to China. It is considered valueless here except for sale.[3]

Nowhere has the chemist wrought greater marvels than in making perfumery materials, and the vast extension of that industry in recent years is due to his improvements upon nature. He takes

[1] Cf. Tariff Information Series 19, United States Tariff Commission, *The Crude Botanical Drug Industry*, 1920, p. 28.

[2] Among others are copaiba, tolu, aconite, asafetida (a gum resin from Asiatic deserts), manna, jalap, althea, cardamom, senna, aloes, orris, etc. *Ibid.*, pp. 18–47.

[3] *Ibid.*, p. 55.

compounds which are in bad odor and makes them to delight the senses. Smells that no self-respecting insect will endure are by the chemist turned into fragrance for womankind. Many men find oil of citronella as abominable as do mosquitoes, yet this villainous product of an Indian grass becomes by chemical magic the basis of a series of delightful perfumes. A lily and a lilac product are made from it and practically every new flower odor — except rose and violet — contains some citronella derivative.[1] So castor oil, beloved of aviators because it endures heat and cold, and the bugbear of children, is rescued from the status of a drug or an unseen lubricant and made to shed abroad an odor of violet. The oil of the cheap lemon grass of British India is transformed until, reincarnated, it also breathes violet fragrance.

Some old friends remain. Otto of roses still comes from the Balkans and bergamot from Italy. Lavender and geranium oils are sent by France, sandalwood oil by French Guiana, orange and lemon oils from Italy. Citronella and oil of lemon grass come from Ceylon and Java in larger quantities than any of the others, and are here transformed — it is hardly correct to say manufactured.[2] The materials for the perfumery in-

[1] Cf. *Dictionary of Tariff Information*, United States Tariff Commission, 1924, 'Oils, Distilled or Essential,' pp. 521–27.

[2] Cf. *Chemistry in Industry*, The Chemical Foundation, Inc., New

dustry, flower products, essential oils, animal and chemical products are collected from all parts of the world. Ambergris is a treasure-trove from the sea. Musk still is had from Himalayan deer though there is artificial musk. Civet recalls the African civet cat. Menthol is made under control of the Japanese Government. But on the whole all things have become new in the realm of perfumes, and my lady uses with gladness upon her dainty person the products of coal tar. Modern perfumes are chemical products, and the perfume chemist is almost a creator, for out of the coarse he brings the delicate and from the ugly he develops the beautiful.

Our national flavor, vanilla, is the aromatic constituent of an alleged bean, which is no bean at all. The pod, which has a superficial resemblance to a common bean-pod, is the fruit of a perennial climbing orchid native to the valleys among the mountains of Eastern Mexico. The vanilla bean of commerce is the cured, full-grown, but unripe fruit of this plant, which has been cultivated in the hinterland of Vera Cruz and near Oaxaca since prehistoric times. Outside of Mexico the vanilla bean is chiefly a product of the French island colonies of some of which America hears little,

York, 1924, article 'Perfumes and Flavors,' by S. Isermann, vol. I, p. 253 *et seq.*

Reunion (Isle de Bourbon), the Comoro Islands, Guadeloupe, Tahiti, and Madagascar.[1] The natural fruit has a competitor in tonka beans from Northern South America, in coumarin, a coal-tar product, and in vanillin, made by a chemical process from eugenol, a product of oil of cloves which we get from Zanzibar. The makers of vanillin have uplifted flavoring extracts much as the chemist has done with perfumes, for without vanillin, the flavor which constitutes over 80 per cent of our consumption would be a great luxury.[2] Many synthetic flavoring materials are derived from coal tar.

In the industrial areas we have traversed there is everywhere found a mixture of foreign and domestic materials without which the industries could not exist and which varies only in degree. There is also a condition of constant change arising from the progress of research and the application of science in new ways. Old materials pass from use, new ones enter: a foreign supply ceases, another springs up: domestic materials replace foreign ones, and *vice versa*. The only way to fix with precision the condition existing at any one

[1] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Vanillin,' and 'Vanilla Beans,' revised edition, 1921, pp. 23–29.

[2] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Perfumery, Cosmetics, and Toilet Preparations,' revised edition, 1921, article 'Flavoring Extracts,' p. 51.

time would be to stop the flow of commerce and the progress of research until as on a census date a record could be made. Were this attempted, the progress of the following day would alter it, and that progress moves with increasing speed faster, indeed, than the facts can be recorded and read. One of the serious difficulties of modern life in almost any sphere is to keep abreast of the world's progress, for truth is being discovered faster far than the mind of the average intelligent man can grasp it. The knowledge of to-day is the ignorance of to-morrow. Yet beneath all the superficialities of politics, which frequently ignore the realities of life, the drift is toward a closer intimacy, scientific and economic, between nations. As men's thoughts expand the world shrinks. The Far East is no longer far, its products are at our doors and in our homes, and its human problems react upon our own life.

There are certain commodities of universal importance in the respect that they affect our crops whether of food or of raw materials. Out of the three elements necessary in manufactured fertilizers the United States is short of two, potash and nitrates. For the former we look to Europe, for the latter to South America. Chile sends us more than 3000 net tons every working day of sodium nitrate,[1]

[1] Cf. *The Mineral Industry during 1924*, vol. xxxiii, McGraw-Hill

and from France and Germany we draw our supply of potash, not so much as of nitrates, but still, including kainite, at the rate of over 1000 net tons every day in the year. The German and French producers have agreed between them to divide the market of the United States, the former supplying 62.5 per cent and the latter 37.5 per cent of our requirements for three years from August 1924.[1] We produce some nitrates and potash, but far from enough for our farmers. Since the former are important for explosives as well as for fertilizers, we have been preparing to supply our deficiency by the fixation of nitrogen from the air,[2] and prospects are said to be good for the development here of the potash supply which we require for cotton, tobacco, potatoes, citrus fruits, and vegetables.

It is either ridiculous or tragic to speak of the United States as being in any real sense self-sufficient so long as we must draw from others the riches of fertility for which our fields are crying. Great quantities of potash which we need and ought to save go to waste in the dust of our blast furnaces and cement mills;[3] we ought to be or to

Book Company, New York, p. 650 *et seq.*: also *Potassium Chlorate*, United States Tariff Commission, April 2, 1925, p. 2.

[1] Cf. *ibid.*, pp. 591–93 and 890; and *Tariff Information Surveys*, United States Tariff Commission, 'The Potash Industry,' revised edition, 1921, pp. 7, 8.

[2] Cf. *Tariff Information Surveys*, United States Tariff Commission, 'Sodium Compounds,' revised edition, 1921, pp. 79–80.

[3] Cf. *Non-Metallic Minerals, Occurrence — Preparation — Utiliza-*

become as capable as others of drawing nitrogen from the atmosphere. Thus far, however, we have occupied the singular position of being the world's greatest agricultural producer in large part because of foreign supplies of fertilizing materials which we have been either too negligent to save or too busy to make at home. The case is not unlike our great automobile industry lacking the ability to furnish rubber for tires, except that we have dealt more effectively with rubber.

Three other minerals of which our consumption is large and our supply inadequate are considered in conclusion. Pyrites (sulphide of iron) is used for making sulphuric acid.[1] We are well supplied with it, but the cost of transportation from Western deposits has made it impossible at various times and places for the domestic material to compete with the pyrites brought from Spain, and with our own great production of native sulphur. Importations, however, exceed our output.[2]

The American lead pencil is a Mexican half-breed, for the raw material used in the leads comes

tion, by Raymond B. Ladoo, McGraw-Hill Book Company, New York, 1925, p. 439.

[1] Cf. *Tariff Information Surveys,* United States Tariff Commission, 'Sulphur and Pyrites,' revised edition, 1921, p. 7 ; also, *Non-Metallic Minerals, Occurrence — Preparation — Utilization,* Raymond B. Ladoo, McGraw-Hill Book Company, New York, 1925, pp. 465, 614.

[2] In 1924, production pyrites, 160,096 long tons; imports, 243,237 long tons from Spain. Cf. *The Mineral Industry during 1924,* vol. XXXIII, McGraw-Hill Book Company, New York, p. 662 *et seq.*

from our southern neighbor where the mines are owned and operated by an American corporation which refines the material in Saginaw, Michigan. This amorphous graphite is also used for lubricating, stove polish, paints, electrotyping, and in boilers to prevent the formation of scale. Almost all our native graphite is amorphous (production 4071 tons in 1924) and is used for foundry facings, furnace linings, and as a pigment. Most of it is produced in Rhode Island. The crystalline (foliated) graphite from Ceylon is employed in making crucibles for steel, brass, spelter, etc., and our own production of it is small. Madagascar dominates the graphite market of the world, having vast supplies which are cheaply produced. We imported, in 1924, 16,375 tons of graphite, more than half of it from Mexico and enough more from Ceylon to make three quarters of all.[1] At Niagara Falls artificial graphite is produced in electric furnaces and is used for lubricants and other purposes except for crucibles. We consume 25 per cent of the natural graphite which we produce and import in facings for molds in foundries. Nearly half of all (45 per cent) goes into crucibles. Lubricants take 10 per cent, pencils and paints together

[1] Imports from Mexico, 8984 short tons; Ceylon, 3632 short tons. Cf. *ibid.*, p. 355, also *Non-Metallic Minerals, Occurrence — Preparation — Utilization*, Raymond B. Ladoo, McGraw-Hill Book Company, New York, 1925, p. 258 *et seq.*

5 per cent, stove polish, say, 5 per cent, and all other uses the balance.

The floor of a subway or a Pullman car is an interesting illustration of how common things in life come from the four corners of the world. Those floors are made of oxychloride cement of which magnesite is an essential part. Most of this material comes to us from Italy, some from British India. We have, indeed, magnesite of our own on the western slopes of the Sierra Nevada and along the Coast Range in California. There is more in Washington. We are, however, the largest consumer of magnesite in the world, and our domestic supply is both insufficient and distant from the places where much of it must be used. It is an important factor in the lining of metallurgical furnaces and in stucco, and it enters rather intimately into our lives when it takes the form of epsom salts. For reasons of cost, therefore, as well as of quality, 56 per cent of our consumption in 1924 was from foreign sources, and a recent authority states that if we are to continue to use one half or more of the world's production of magnesite 'considerable dependence must be placed on foreign deposits.' [1] This means that for part of the material required

[1] Cf. *The Mineral Industry during 1924*, vol. XXXIII, McGraw-Hill Book Company, New York, p. 465; also, *Non-Metallic Minerals, Occurrence — Preparation — Utilization*, Raymond B. Ladoo, McGraw-Hill Book Company, New York, 1925, pp. 331–32.

for floors in future subway cars and hospitals, railway stations, hotels and offices, we shall be looking across the sea.

In this chapter we have encircled the globe in our study of the sources of materials. It must be clear to any one who without prejudice looks calmly at the facts of life that the great ships which traverse the seven seas are but gigantic shuttles weaving the web of a mighty fabric which unites the nations. Of that fabric, we, on either coast, hold the ends, and the farther portions are in the grasp of all the peoples of the earth: neither they nor we can let go or dare let go.

CHAPTER XI

THE NATIONAL DEFENSE

Before 1914 it was often said that future wars would be short because their cost in life and treasure would be such that nations could not endure them long. There were examples also from recent history which seemed to show that military organization had reached such perfection as to involve a prompt decision when once whole national forces were thrown into the field. Men pointed to the wars between Prussia and Denmark, 1864, between Austria and Prussia, 1866, and that between Prussia and France, 1870–71, as prophetic of the brevity of coming contests. It is certainly true that Germany intended her next effort should be short, sharp, and decisive. That was her reason for invading France through Belgium in 1914. Nothing was less in German calculations than the check at the Marne, and nothing was farther from the thoughts of men than that a war which involved civilized mankind should endure as a devilish stalemate for over four years of combat. Certain factors that entered into it also were novel. Tanks had not been foreseen; chemical warfare was unknown. Few dreamed of the rapid and ex-

tensive development of fighting in the air. It was, as it always is, the unexpected that happened.

However far-seeing and thorough the preparation for war in time of peace may be, the evolution of the actual contest will almost certainly involve surprises, especially when the contending forces are sufficiently balanced to prolong the strife. The intensity of modern war, added to its possible duration, makes a drain upon national wealth such as was never the case before the World War. Every power engaged in that contest, ourselves included, not only strained its own resources, but called upon so much of the world to contribute as was available to the respective sides. The way in which the Allies looked to the United States for money and materials is well known. Germany had no such fiscal resource available, but throughout the contest a large part of Europe and much of Asia was freely open to her. Nevertheless, the blockade by sea proved a strangle-hold which brought to the Central Powers severe and widespread suffering, though little of the actual fighting took place within their boundaries. The physical and industrial resources of three empires reaching from the North Sea to the Persian Gulf were not sufficient to prevent general deprivation, although every method known to science was utilized to provide the materials required to sustain the armies

and the civil population. The contest ended before the United States had been able fully to mobilize its industries so as to make them the powerful factor that they would have become had their development as a controlled war machine reached its height. This was so much the case that it was only by the severest regulation that we were able to provide the necessary equipment and supplies for our own army in France without interrupting the flow of munitions to the Allies. There were about two hundred commodities respecting which our situation was at some time critical during the World War. Having learned our lesson in the severe school of experience, regular officers have been assigned since the Armistice to study the production and mobilization of these necessary commodities, and they are assisted by trade associations and technical societies and by civilians who are especially well-informed. This study has included not only the mechanical and chemical means of production and the factor of transportation, but also the resources whence must come the materials for manufacture. One lesson gained from these inquiries is admitted to be 'that the United States is not inexhaustible in its resources.' [1] Allied to this — a vital part of it, indeed — is the

[1] Cf. address of Colonel Harley B. Ferguson, Corps of Engineers, U.S.A., on 'Some Problems of Procurement,' before the General Service Schools at Fort Leavenworth, Kansas, January, 1924, p. 21.

problem which exists respecting thirty specific materials which are called strategic because they are essential to the prosecution of war and because we either do not produce them at all or can supply them only in quantities which are insufficient even for peace-time requirements.[1] The list of these strategic materials follows:

Antimony	Nux Vomica
Camphor	Opium
Chromium	Platinum
Coffee	Potassium Salts
Cork	Quicksilver
Graphite	Quinine
Hemp	Rubber
Hides	Shellac
Iodine	Silk
Jute	Sodium Nitrate
Flaxseed	Sugar
Manganese	Tin
Manila Fiber	Tungsten
Mica	Vanadium
Nickel	Wool

It would be well if every American citizen could carefully read this list and consider calmly the facts that lie behind it. It is not a mere estimate with a more or less doubtful personal equation. It is, on the contrary, a carefully prepared official statement with the experience and the authority

[1] Cf. address of Colonel Harley B. Ferguson, Corps of Engineers, U.S.A., on 'Some Problems of Procurement,' before the General Service Schools at Fort Leavenworth, Kansas, January, 1924, p. 21.

of the War Department in support. It arose out of the strenuous effort to equip our forces during the World War. There is no nonsense about it; it deals with stern realities. We need every one of these items in peace; some of them we do not and cannot produce at all and of none is our supply sufficient even in these peaceful days. The coming of war, even the coming of those preliminary conditions which might seem likely to eventuate in war, would bring a demand for them which the resources of this country are unable to meet. Here is no screaming eagle, no illusion. Here instead is the plain fact of dependence upon other countries. Every continent is concerned. We may, in other words, need the help of the whole world to do our next large fighting job, for wars between great nations are now of such a character that all the earth takes part in the struggle, with its materials if not with its men.

Facing, then, 'these weak points in our resources,' to quote the words of Colonel Harley B. Ferguson, how shall we deal with them?

First, we must at least catch a glimpse of the problem as it really is. We now know that when war breaks out and at recurrent intervals following that event we shall require more than 30,000 articles divided into more than 700,000 parts, in varying quantities and at different times. Every

soldier needs, for example, sixty yards of wool and uses four pairs of shoes in active service where one would suffice in civil life. The schedule of the Quartermaster-General prepared for the event of war calls for the production of 35,700,000 pairs of service shoes during a twelve-month period. The manufacture and construction of certain airplanes calls for approximately 27,000 parts and assembling operations. It is not slow but rapid progress to get light artillery shells into steady quantity production six months after work starts, and the manufacture of the thousands of gauges that must be accurately made is a technical problem of a high order taking time for its solution. Beyond a certain point it *cannot* be hastened. The average citizen has but the faintest idea of the vast and intricate problems involved in setting an army on its feet ready to fight, and because of his ignorance he is indifferent, if not antagonistic, in time of peace, and apt to be volubly critical in time of war. This is not said in support of militarism, which is a hateful thing. It is written in opposition to negligence, which is a dangerous thing. A former Secretary of War has wisely pointed out that men want policemen and firemen and believe in safes and locks, they insure their lives and property, but they have never yet insisted that the nation shall take similar precautions, much less have they re-

membered that in taking them it must look to all parts of the globe for the means of doing so.[1] It would be foolhardy to expect to secure the needed materials after war broke out, for many of them come from far away, one third of them from Asia, and every continent is concerned, together with Australia, the Philippines, and the islands of Oceania. Some of them must be weeks on the way exposed to all the risks of transit in time of war. The supply of sugar is near at hand in Cuba, and nickel can be had upon the Canadian side. Four general suggestions are made, namely, substitutes may be found, conservation is possible, development may be undertaken, and reserves can be assembled.

Let us see what light is thrown upon the subject by a 'Study of Certain Raw Materials' made under the auspices of the Ordnance Office in 1924. It assumes in general that one ocean will be open to us, but admits that the time may arrive when both the Atlantic and the Pacific will be closed to our commerce, pointing out that this extreme condition was that which confronted Germany and Austria during the World War.

The chief use made of antimony[2] in war is for

[1] Cf. article 'Our Industries and National Defense,' by the Honorable John W. Weeks, Secretary of War, in *American Industries*, May, 1924, vol. xxiv, no. 10.

[2] Cf. p. 158, Chapter VIII.

hardening shrapnel bullets, which are of lead with about 12 per cent of antimony. A limited amount is also used in primers. Our war-time requirements are estimated as 20,000 tons yearly, more than double our consumption in peace, and our own production is negligible. China produces half the world's supply and France about one fourth of it. Should the supply of Chinese antimony be cut off, the shortage which would inevitably follow might in time be partly supplied by working mines in the Rocky Mountain States which are idle except when war prices stir them to activity. A possible substitute for hardening lead might be found in bismuth, or bullets of pure lead or of steel could be used.

No satisfactory substitute has been found for chromium [1] for steel or for use in the lining of open-hearth steel furnaces. The War Industries Board assumed that two and one half pounds of chromium were utilized for every ton of steel manufactured, and it is estimated that during a major emergency we should need about 150,000 tons annually, which is more than we were able to produce under the stress of the recent war. Certain stocks of domestic ore are said to be available to tide over war necessities until the American mines on 'some two thousand scattered deposits in eight States'

[1] Cf. p. 43, Chapter III.

could be put into operation. This would mean the depletion of the limited resources we possess at a high cost for production involving the use of low-grade ores and low efficiency in consumption. It would react hurtfully upon the use of chromium in tanning. No substitute for chromium in hardening steel is known.

Our probable war needs for graphite [1] are estimated as 15,000 tons a year, more than three times our domestic production in 1924. This, it is thought, can probably be produced under pressure in this country, but it would take months to develop such a rate of output, and it is subject to the important exception that flake or crystalline graphite for use in making crucibles for melting metals would not be available in sufficient quantity.

Approximately fourteen pounds of manganese [2] alloys are used in making each ton of steel by the open-hearth process, and the Ordnance Department uses a special hard steel containing twelve to fifteen per cent manganese for helmets, and the track shoes in tanks are also made from steel alloyed with manganese. Even with production stimulated by war the United States would probably have to depend upon foreign sources for more than half its requirements of high-grade ferromanganese, although it is admitted that under

[1] Cf. p. 203, Chapter X.

[2] Cf. p. 40, Chapter III.

extreme stress, by the use at high cost of low-grade ores, we might be temporarily independent. It is, however, estimated by a committee of the American Institute of Mining and Metallurgical Engineers on industrial preparedness that 290,000 tons a year of metallic manganese would be necessary to make steel during an emergency. Our highest production of the metal was 60,000 tons in 1918, and in that year our production was less than half our requirements. There is as yet no satisfactory substitute.

The World War required 90 per cent of the nickel [1] which we could produce or import. The estimated requirements in war are at the rate of 25,000 tons a year. Our own production is barely one per cent of this. We should look to Canada, and if for any reason that supply were not available, we should have to turn to New Caledonia in the South Pacific.

Platinum [2] in war is used in making sulphuric acid by the contact process and is essential also in the manufacture of nitrates from the air. It is, therefore, of vital value in the production of explosives. It is necessary in crucibles and dishes for chemical laboratories and in thermo-couples for temperature control in many processes. It is roughly estimated that 160,000 ounces of platinum

[1] Cf. p. 49, Chapter III. [2] Cf. p. 112, Chapter VI.

annually would be required for necessary military and commercial uses (omitting all jewelry) in the event of war. This is more than the total recorded world's production for ten years past.[1] Unless the recent discovery of platinum in the Transvaal shall develop into a considerable source of supply, it is difficult to see whence it can be had, for the production of Russia and Colombia does not seem to be sufficient.

The probable requirements of the Ordnance Department of quicksilver[2] in time of war is 600,000 pounds annually, chiefly for use as mercury fulminate which is the usual detonating material. The question whether this amount will be available from domestic sources will depend upon whether the use of the metal in other ways can be restricted. By using substitutes for certain drugs and in part in detonators, the United States might now produce sufficient mercury 'for strictly military needs for one more war,' but would require imports if paint and drug requirements were to be fully supplied. The domestic deposits are thought to be approaching exhaustion, though still capable for a time of increasing production under a war stimulus. It is considered doubtful whether any further

[1] Cf. *The Mineral Industry During 1924*, vol. XXXIII, McGraw-Hill Book Company, New York, 1925, article 'Platinum,' by Dr. George F. Kunz, p. 588.

[2] Cf. p. 168, Chapter IX.

domestic resources can be found which are at all adequate. So that for the war after next we should have to look about us.

The scarcity of tin [1] during the World War led to the use of substitutes and to conservation. Less tin was put in babbitt metal and solders, and cadmium was substituted for the latter use. The War Industries Board planned substitutes for tinplate containers which would have effected a saving of 260,000 tons of tinplate annually or over 4500 tons of pig tin. Were imports of tin shut off in war we might learn a lesson from Germany by folding, crimping, and riveting metals instead of soldering them, and by substituting aluminum [2] plating. In 1918 with all the restrictions in effect we consumed about 80,000 tons of tin, of which 60,000 tons were directly or indirectly for military purposes. We produce no tin, and unless we are to suffer for lack of it in time of war the question of substitutes for it must be given serious thought.

Tungsten [3] is most widely used for self-hardening steel. Our own production has practically ceased because it can be produced so much more cheaply in China. It is in a measure rivaled by molybdenum which, used as a steel alloy, gives self-hardening properties. Under the strain of war it is possible

[1] Cf. p. 47, Chapter III.
[2] Cf. p. 102, Chapter VI.
[3] Cf. p. 51, Chapter III.

that our own mines, though of low grade, might again be brought into service. We used about 16,000 short tons of tungsten ore in 1918: our own production was about 5000 tons.

Were our supply of vanadium [1] from Peru cut off, presumably the scattered deposits of vanadium minerals in our Western States would again come into service. They are a long way from any railroad and occur here and there in a belt some two hundred miles long and fifty miles wide along the boundary between New Mexico and Utah.

We might use rayon in place of silk for some purposes, but it would doubtless be necessary to restrict its uses for clothing in war-time. Another cellulose product is said to be under development called 'sniafil' which is expected to fill in a measure the place of wool. Since the wool we should need would have to come from Argentina and Australia with New Zealand, we should probably be happy to find any reasonable substitute, remembering that the Germans were forced to use paper for clothing. Cotton is the only fiber of which we produce enough and to spare, and it could be made a temporary substitute in many textiles. That was done in the Great War by making cotton blankets which did excellent service. It would be expecting much, however, to look to cotton to take the place

[1] Cf. p. 53, Chapter III.

of jute, hemp, and manila fiber, and the realization would be forced upon us in any extended contest that one of the essential economic weaknesses of the United States is its lack of cheap fibers. The list of strategic raw materials does not include sisal, and we may wonder how it is expected to harvest our crop of wheat, or whether cotton is supposed to take the place of sisal in binding twine as well as of jute in bagging, and of hemp and manila fiber for other purposes. It would seem to be one of the chief difficulties, for which no full solution is apparent, to provide an adequate substitute for the hides and skins which in peace come to us from all over the world. Tanning materials — other than chromium — do not appear on the list, though we do not produce sufficient for our peace needs and would require more in war.

It is not necessary to enter into further details of the military list, for the same general considerations apply to all. It is hard to see what can be done in the way of conserving supplies which do not exist in this country or which, if they occur, are insufficient. An illustration of a reserve for war exists in the areas which are withheld from oil production looking to future naval use. Possibly, under the head of conservation may be included the withholding from present exploitation

of such supplies of chromium, tungsten, and manganese as we have. A practical step would be reforestation on a large scale looking to a sufficient supply in coming years of cellulose for textile fibers as well as for the wood pulp which we now so badly lack, and for lumber. From a military standpoint conservation will mean a restricted use of any commodity by the civil population.

Development may be in some measure practicable if it means the study of known supplies which we do not use and prospecting for more, including the construction, as a preparation in peace for the time of strife, of roads and perhaps railroads in order that those resources which are in remote places may be ready for use in time of need. There are a number of the materials that might be included under a broad plan for development. Nitrates are among them, and potash and flaxseed for linseed oil, and perhaps the production of iodine and camphor. During the Great War our native resources of manganese and other metals had to be hastily developed; the cost was out of proportion to the result, but necessity ruled, for one did not count the cost when the house was on fire. There is the possibility of assembling reserves, but this involves an estimate of quantities which in turn depends upon some calculation of the time and extent to which they will be required.

It is the plan of our General Staff that upon the outbreak of war two armies may be equipped from available reserves so that they can begin military operations without serious delay, and that by the time a third army has been organized and trained, its equipment will be on hand. The War Department, however, recognizes that this is an ideal picture, 'for every day it becomes more plain . . . that there are certain articles which we cannot, even under the most favorable conditions, furnish to the troops in time for their entry into the theater of operations, because we have no war reserve and because industry is not equipped to-day to produce these items quickly enough no matter how carefully the plans may be laid or prepared. One of the most vital of these articles is aeroplanes. . . . The vital importance of all this planning to the military man lies in the fact that his program is dependent upon the efficiency of industry, and without a plan industry will be snarled into a thousand knots whose unraveling may mean the defeat of the nation irrespective of the courage and energy of the army. Man power and material must develop side by side.' [1]

The greatest difficulty, however, in gathering reserve supplies will be to secure the necessary

[1] Cf. address of the Honorable Dwight F. Davis, Secretary of War, before the General Service Schools at Fort Leavenworth, Kansas, January, 1924, printed under the title of *Industrial Mobilization*, p. 14.

vision and willingness to spend on the part of legislators. That is an almost impossible task. Democracies are not noted for foresight, and *laissez faire* is cheap and alluring. Furthermore, others besides ourselves have something to say about this, for some of these strategic materials on our list are strictly controlled by foreign governments — rubber, for example, and camphor and quinine — and more of them can easily and quickly be so controlled, as we found during the war. We did it ourselves and may be reasonably sure others will follow our example.

When the best thought has been given to the problem of the materials for our national defense and the wisest words have been spoken upon the subject and the utmost practicable has been done in advance, the problem still remains one of supreme difficulty, involving grave national hazards. Platinum for use in our chemical works must be secured in considerable quantities either from South Africa, Colombia, or Russia; quinine must come from Java or Peru; nux vomica from India; and medicinal opium from Western Asia. It would be difficult in time of war either to continue long with such rubber supply as we have or to secure a fresh one from abroad or to provide a substitute rapidly enough for our needs. There is no doubt whatever that American science and energy would

work marvels or that there would come to light unexpected resources as surely as there would be unexpected demands. By using up our physical capital in ways made effective by need we should continue the battle long, and the fictitious prosperity of war might conceal the economic losses until the devoted spirit of our people should have achieved success. But the cost, the awful cost, even to defend ourselves, for no one imagines America will ever enter on an aggressive war! Were we to seek, as Bertrand Russell predicts, the hegemony of the world, it would not be done in the way of militarism. Nevertheless, it is the simplest common sense to assure the War Department that the wise work of industrial preparation that they have undertaken has the full and intelligent support of our people.

It is on the whole rather evident that we shall have to select the nations with whom we are going to fight in the future with a great deal of care so as to avoid their being the only people who possess the materials we must have with which to fight them. It would never do, for example, to get into difficulties with powers whose control of the sea was such that our navy could not certainly preserve free movement on the oceans. Unless our fleet kept the seas open, our cattle and sheep must be slaughtered ere long to provide leather which

we should then need in greater quantities, and today our own production is insufficient. It is easy to forget in thinking of the recent world contest that a factor in it of controlling importance was the privilege of using the seven seas by the Allied and associated forces, and that when this was threatened by the German submarine attacks the bottom seemed almost to be dropping out of everything. Those were gravely anxious days when the submarine warfare was at its height. In these times of peaceful prosperity we may comfortably criticize the creation of great numbers of ships that now are useless, we may look with a superior smile at the idle fleets in the Hudson or the Delaware, but those who do so will do well to remember the time when the cry of the world was for ships, and yet more ships, and when the shipbuilding resources of every nation that possessed them seemed likely to be insufficient to keep *Kultur* from passing this way.

There are men who remember very well what it meant during the war to inquire abroad whether we might be allotted certain necessary things which we did not have and could not produce, such as tin. They will not be inclined to take a jocular view of the situation which our official list reveals any more than will an Englishman treat lightly the question of his wheat and cotton supply or forget the control of the sea necessary to secure it. Americans

who think soberly about their Government in its relations to the world will find a forceful lesson in the story of the war between the States. The record of that contest between brethren would have been different if the ports of the South had been freely open to the world. The constriction of the blockade brought about an economic pressure that wore down inexorably the gallant resistance of the South to the larger forces which the Northern States brought into the field. Yet at that time the economic demands made both by war and by commerce were far less than they are to-day, and many of the military materials which are now necessary were unknown.

Our admirable but sometimes misplaced optimism will suggest, not that we will muddle through, for we should hardly admit so much. Rather, it will say that we shall manage it 'all right' when the time comes, a good deal in the temper of the statesman who suggested that a great host of Americans would spring to arms in a single day, without stopping to think where they would get shoes and overcoats, much less arms. Our chemists, we know, would work wonders. They would need to do so to keep us in medicines and explosives. In order to estimate soberly and without pessimism the economic effects of a long, successful defense, it will perhaps be sufficient to ask the reader to look back

over the foregoing pages and to think for himself, neither in optimism nor the reverse, but calmly, yet seriously, in the same spirit in which those who have in their hands to-day the duty of our defense are considering the facts with which they are face to face. It is not cowardice but courage to look at the truth as it is, and if in all respects the facts are not as we wish them to be the more courage is needed to face them fairly. It is mental cowardice, on the other hand, to assume a silly optimism that is unsupported by realities and to trust, ostrich-like, in covering one's eyes, or when the storm threatens to be loquaciously confident that it is not to be much of a shower.

Looking again thoughtfully over our list, which it is well to remember is a list of war materials and takes no account of civil needs or of the requirements of peace, we find that certain commodities are omitted which, though not necessary for military operations, are important to the people at large. Tea is not there, nor cocoa nor chocolate, nor linen, coconut oil, newsprint paper nor wood pulp; there is no mention of materials for hats, nor of the foods which we draw from afar. Nothing is said of the things that are necessary to make our telephones and electric lamps and radio apparatus. There is no mention of asbestos or rattan or of the materials needed for paint and

varnish. Yet every one of these would be involved in the maelstrom of an important war, nor can we provide them for ourselves.

On the whole, it adds to the hopefulness of life to reflect that the increasing complexity of living is making war more difficult, not because human nature is changed — man is nearly or quite as much of a fighting animal as ever — but because in the evolution of his demands luxuries have become necessities and have so multiplied themselves that the life of every man has become intertwined, even without his knowledge, with the lives of all men everywhere, with the result that he neither lives in peace nor fights in war without the help of the other fellow. Indeed, to one looking closely into the currents of the world's economic life to-day nationalism in its strict sense is becoming almost absurd because those currents are obliterating national boundaries and sweeping away cherished prejudices. Listen to this Senator as he rises to speak that which was the 'patriotism' of the political platform twenty years ago, but which is the futile ignorance of to-day. He lauds our institutions, our Constitution, our fathers, and grows fervid in his assertion of the separateness and the sufficiency and the popular perfections found nowhere else save in our own beloved land. Much that he says is true, much of it, indeed, would in-

spire us rather to grateful thanks for the guidance and protection of an All-Wise Providence than to the particular cause to which the speaker ascribes it. Much of it also would lead us to think that *richesse oblige*, and that the current phrase might well be altered to read, 'They shall serve that have the power and they shall help who can.' But quite apart from our agreement or disagreement with the Senator, look at him and see what he either does not see or, seeing it, forgets. He is a microcosm as he stands there, a little world all by himself, his shoes, his clothes, the things he has in his pocket, the paper from which he reads, the hat which lies on his desk beside him, the carpet on which he stands — these and many other things that surround his person and are of his daily environment, these are all provided with the help of the nations of the world and by the service of the peoples of the globe. Indeed, it is time that scales should fall from the mental eyes of those who speak and write in this day of the world's progress that they may have vision to see that the ends of the world have come near and that no nation liveth to itself.

CHAPTER XII

THE CONCLUSION OF THE MATTER

In an ancient city whose influence over art and thought is still powerful a man stood on a spot devoted to the God of War and spoke daring words of peace. 'God,' he said, 'has made of one blood all nations of men for to dwell on all the face of the earth.' Every local circumstance seemed to combine to make the remark incredible. The speaker, though a Roman citizen and trained in Greek culture, was by blood a Jew, one of that race which then spoke of other men as Gentiles. The audience were Athenians, inheritors of an intellectual pride which deemed the rest of men barbarians. Auditors and orator were subjects of that stern Roman rule under which few were free and many were slaves.

The elements of time and place and persons were all hostile to Paul's assertion. It must have sounded strange to the hearers as it still does to some who read it twenty centuries later. Were the words but the rounded phrase of a fluent speaker, arising from poetic fancy in an environment of Oriental imagery? Were they an oratorical gesture, the audible sign of an inward enthusiasm?

Or were they a flash of far-seeing wisdom which we, from a cold Western viewpoint, might criticize as literally untrue, but which the speaker with far vision and Eastern imagery could project down the ages till the time when the truth should become clear? What was there, what is there, in that great saying, so said in such a place by such a man and to such hearers? We may not, of course, with Occidental precision charge the speaker with misrepresenting the known facts of his day. It is more accurate to assume that, as men of his time and race commonly did, he saw such visions as actualities, and it is worth while to inquire if the conditions he foresaw have in any measure become actual. The words of him who thus spoke in Athens in the first Christian century have ever since their utterance embodied one of man's greatest ideals, and it may not, therefore, be amiss to consider briefly how far they now express reality. By a little careful examination of the record we may reach some conclusions that will clarify our own thought.

In one of our large cities not long ago an audience sat charmed with the music of the composers of many lands. No one objected because Beethoven was a German, Sibelius a Finn, Chopin a Frenchman, Tschaikowsky a Russian, and Paderewski a Pole. In that place the music of Elgar the English-

man and Grieg the Norwegian were as welcome as that of our own lamented MacDowell. Mozart, Wagner, Verdi, Rossini — none thought of their nativity or residence. Not far away in a great opera house the artists of many countries sang with tongues and among them were welcomed those who were our very own. We enjoy the folk-music of Spain, Hungary, and other countries and are proud that an American chorus is a great exponent of Bach. We are content that our American composers and singers shall be reckoned as equal members in this great brotherhood, for the world has lost its sense of nationality in music.

A great scientific body met in one of our Western cities. In its various sections honor was paid to Steinmetz the German, whom we count as ours, and to Pupin the Serbian who belongs also to us. There was recognition of Pasteur the Frenchman and Madame Curie the Frenchwoman. Frank acknowledgment was made of our debt to Faraday and Maxwell the Englishmen, and all recognized the creative service of Galileo the Italian, and of Marconi, his modern successor. In particular, one American spoke with cordial approval of the work of Einstein the German Jew. The world has long lost the sense of nationality in science, and the utmost we ask is that our scientists shall be received as equal fellows into that goodly company

of men of all lands who through research are opening the way to a larger life.

In another American city is a great gallery of art. In it are pictures by Rembrandt and Frans Hals the Dutchmen, and others by Murillo and Velasquez the Spaniards. Not far away are paintings by Landseer the Englishman, and Corot the Frenchman. The whole world acknowledges the supremacy in their form of art of Leonardo da Vinci and Michelangelo, both Italians. We rejoice when our own American brethren are counted worthy to enter into and abide within that high fellowship. The world has well-nigh forgotten nationality in art.

Many of us have followed the adventures of Tom Brown at Rugby and at Oxford, and treasure the works of Dickens and Thackeray. Does any one object to 'The Three Musketeers' because its author was a half-breed Frenchman, or to the writings of Ibsen because he was a Norwegian? We acknowledge the power of Tolstoi and Dostoievski the Russians, of Sienkiewicz the Pole, and Ibañez the Spaniard. We have been fascinated with the fiction of Victor Hugo, we have enjoyed the plays of Rostand, we have taken Shakespeare to our hearts. All of us are the beneficiaries of Chaucer and Spenser, of Goethe and Schiller, of Molière and Cervantes, of Dante and Virgil. We should be glad to hear that an American writer was

chosen by opinion to be one of the great company of letters who have illumined the minds of the world. Englishman, Frenchman, Norwegian, Russian, Pole, Spaniard, German, American, we take them all into our homes and our minds until they become part of our very selves, for the world has lost the sense of nationality in literature.

It is common to speak of differences in religion, yet even in this troubled sphere there is abiding unity. The churches of a thousand cities lift their spires toward the sky; in many a great cathedral, in hundreds of modest shrines, men of many races and tongues, each in his own way and according to his vision, acknowledge the spiritual leadership of Him who was an Asiatic Jew. Long centuries ago the civilized world began to put aside nationality in religion. The Greek Chrysostom, the Roman Augustine, the Irish Patrick, the Spanish Loyola, the Italian Francis, the English Wesley, and our own Washington and Lincoln acknowledged that common Master.

Here are five great phases of human life, music, science, art, literature, and religion, and in each of them the statement made so long ago in Athens has become visibly true. It needs no uncommon vision to see the drift toward a yet closer brotherhood in these great areas of life. There is further illustration. The world has but recently emerged from the

horrors of a great war, and still, when it stops to think, is appalled at the cost and the pain and the moral upheavals that arose from it. But as heroism often shines brightly against a background of calamity, so there were phases of the great conflict that it is well not to forget. One such appeared in the unity of most of mankind against a wrong that was hateful to the general conscience. Men of every race and color, men of all faiths, Catholic, Protestant, Jew, Greek, Mohammedan, Shinto, Buddhist, Confucian, and men of no faith at all, fought side by side. The red man and the negro from America, the yellow man of China, the black man and the Boer from Africa, the Maori of New Zealand, the Hindoo, the Russian, the Greek, the Arab, died in the same cause and on the same battle-field with the American, the Englishman, the Canadian, the Frenchman, and the Italian. The rifles of the enemy were no respecters of persons: the Rumanian laid down his life beside the Moor and the man of Portugal died with the Australian. Here the blood of the nations mingled in one stream of sacrifice. In the fiery test of war much of the separating spirit of nationalism was for the time swept away by the flood of patriotism. The curve of human progress once did rise so far. It may have fallen since, but the record is there as a constant witness and inspiration.

It is not the purpose broadly to decry nationalism. Every nation has its own individual contribution to make to the general weal, and the world would be a sad loser if the differing national characteristics were to be mingled in even an approximate uniformity. The differences of climate and habitat, however, would prevent such an unhappy result even if the genius of races were to prove insufficient. The thought is not to make people alike but to make them fraternal. Still less is it the purpose to speak other than in reverent praise of that fine spirit of devotion which leads a man to give his life for his country. On its higher levels nationalism is an uplifting power; on its lower levels it may be at least something outside of a man to keep him from utter selfishness. The present purpose is rather to suggest that nationalism is often partial and incomplete, leaving essential related facts out of account, and that as a motive force it has normal limitations, and, when these are reached, it is necessary for the progress of the nation and the world that something higher, stronger, more broadly extensive, and less narrowly intensive shall take its place. For, though it is true that the influence of nationalism has led to permanent good, it is also true that in its extreme form it has left deep scars on the world's history. Its good, though

great, is of limited scope; its evils at their worst know almost no boundaries. Nationalism survives chiefly in the fields of economics and politics, but its supremacy is threatened in both, and in the economic sphere finance as well as science and industry are its powerful foes. Its survival in politics is due in major part to ignorance, the fruitful cause of misunderstanding.

A committee appointed by the Chamber of Commerce of the United States to consider our economic relations with the world from the point of view of our export trade in wheat and flour, in cotton, food products and manufactures, visited Continental Europe in 1921 to study conditions there and published a report. They said:

> We assume no member of the Chamber of Commerce of the United States will seriously consider the propositions that this country should isolate itself from Europe, our greatest market, or that the question of our foreign trade does not interest practically every business man, every farmer, and every worker in the United States. The development of our industries requires not simply that our foreign trade be maintained, but that it be persistently expanded.[1]

More than two years later, in April, 1924, the Mechanics and Metals National Bank of New York said:

[1] Cf. *European Problems and Their Relation to American Business*, published by the Chamber of Commerce of the United States, September, 1921, p. 5.

In the long run it must be clear that no problem which now confronts the country is purely local or purely American. The local aspect supplies only a part of the picture inasmuch as the United States has become part and parcel of the whole fabric of international affairs. The peace of Europe; the funding of its debts; the stabilizing of its battered currencies; the rebuilding of its trade; the restoration of international exchange; all these have so direct a relation with respect to the affairs of the American manufacturer, farmer, exporter and importer, that every local problem goes hand in hand with every problem of foreign origin.

This is not overstated. Americans may reasonably talk of self-sufficiency and of economic isolation when and only when they are prepared to abandon all or part of many things of constant use among them, such as telephones, electric light, radio, phonographs, carpets, linoleum, newspapers, railways, automobiles, brushes, bagging, linen, woolen and silk clothing, shoes, and the doormats on which our shoes are wiped. These and many more are made by securing from other countries essential elements that we either are unable to supply or cannot provide in sufficient quantity or of proper quality. Were we, indeed, to attempt to put into actual practice the self-support of which Mr. Bertrand Russell was so sure, among the early things to disappear would be such sports as baseball, tennis, and football, and with them would go others not to be restored until we had

native supplies of rubber, cork, and other materials.

The international character of modern sport is evidenced by associations for Olympic Games, and for conducting tennis, polo, boxing, rifle, and chess contests on a world scale. International golf tournaments and yacht races are well known. The automobile is doing its part; American, British and German, Peruvian and Scandinavian groups were a portion of the Federation of Touring Associations (twenty in all) which recently met in Belgium to consider common problems. The World Motor Transport Congress, which gathered in January, 1926, in New York, was attended by representatives from Germany, England, Ireland, Scotland, Austria, South Africa, Australia, France, Egypt, Spain, Italy, Syria, Mexico, and many other countries. There are now more than forty permanent international scientific associations. The powerful hand of mercy of the International Red Cross reaches the whole earth. Sixty-two governments, comprising ninety-six per cent of the world's area and ninety-seven per cent of its population, are represented in the International Institute of Agriculture. The International Congress for Air Legislation included twenty-six nations in its membership at a recent meeting. The International Railway Congress brought nine hundred

delegates from governments, associations, and railways throughout the world to London in June, 1925. It is but recently that the American Bar Association met across the sea. The gathering of the International Chamber of Commerce in Rome in March of 1923, which adopted a resolution stating that it was 'impossible to arrive at lasting settlements without recognition of the interdependence of the different nations,' was attended by six hundred delegates from thirty-six nations. This great permanent organization maintains active committees in all the leading countries of the world, which keep in touch with each other and effectively represent the views of the commercial world to the governments concerned. We read of the Universal Postal Union without considering the full force of the first word in its title or remembering that under its regulations every letter sent outside each nation's boundaries is conveyed. The building of the Pan-American Union ornaments our national capital. The Pan-Pacific Union, the Institute of Pacific Relations, the English-Speaking Union with branches all over the globe, and the Institute of Politics which makes us think in terms of world life, are among the constructive agencies which have recently become active. The great Masonic orders and other fraternal, religious, and educational bodies are international forces.

So are numerous national societies which in different countries keep alive the memory of former homelands, and the Chamber of Commerce of the United States in which sister chambers of American origin but foreign activity are full members.

So far from the idea of a general organization of nations having been a novelty sprung upon the thought of a surprised world, it had many forerunners that prepared its way. There have been and now are numerous leagues of nations which have grown up out of the necessity for common counsel. In them Americans have long functioned responsibly in full membership, even as executive leaders. The greatest of such leagues is a normal evolution out of a preparatory past in which, despite the power of nationalism in political affairs, the habit of international coöperation was acquired.

A few years ago the members of a committee formed to protect American holders of Russian bonds were surprised to find that there were owners of these bonds in nearly every State in the Union and that most of them were people of modest means. A banker has pointed out that the Austrian and Japanese loans placed here in 1924 were not sold chiefly to wealthy men or large corporations. The Austrian loan of $25,000,000 was taken by nearly 9000 American investors and the $15,000,000

for Japan by almost 44,000 separate buyers. Half of the sales in each case were in amounts of $1000 or less; but four per cent of them were over $10,000. The so-called 'international bankers' have been the object of much ignorant criticism by those who did not understand the popular nature of their modern functions in a world which is becoming financially unified. Through their instrumentality investments on behalf of the American people have been made abroad to the approximate extent of $11,500,000,000, exclusive of government debts to a substantially equal amount. Transactions in foreign securities took place upon the New York Stock Exchange during the year 1925 to a total of more than $700,000,000, and to-day our investments 'practically cover every part of the civilized world.' [1] The interest on these foreign loans is not so much paid to the rich few or into the treasuries of great corporations as into the personal pockets of hundreds of thousands of men and women of moderate means scattered all over the country.

This book is written to show how industry and commerce, and with them finance, have followed in the footsteps of science, art, music, and literature, and have been forced to escape from the

[1] Cf. compilation by Dr. Max Winkler, of Moody's Investment Service, *New York Times*, January 4, 1926.

limitations of a narrow nationalism. In so doing, stress has naturally been placed on the import side of our economic relations with other countries, for in this phase our interdependence is most plainly seen. Of course, a like lesson is to be learned from our exports. The comfort of every farmer's home in our Central West, of every planter's family in our South, is intimately related to the power and the desire of foreign markets to absorb our surplus products at remunerative prices. The wages of labor and the return upon capital in thousands of our factories are directly affected by the good will and the purchasing ability of distant markets. Field and factory in every State are influenced for better or for worse by the presence or absence in the minds of men across the seas of that friendly feeling which opens the door to trade.

Finance was from natural causes the last great factor in our economic life to pass through the door into the larger international areas. It has taken the step irrevocably now. It is both amusing and pitiful to see politics lingering with reluctant feet, hesitant, fearful to enter where others tread, not only with safety, but with advantage. Unable to discard or readjust its prejudices or to shake off the shackles of an outworn past, politics slowly yields with lamentations to the pressure of forces too powerful for its feebleness to check. Proclaiming at

one time America as a dominant, self-sufficient nation, able by reason of its mighty power and vast resources to do as it chooses among the peoples of the world, in the next breath these followers of the lesser politics are fearful of the adverse consequences that may befall if we, in our innocence and inexperience, enter into the intimate activities of world affairs. Unconscious that the mighty currents of the world's life are sweeping them inexorably onward with the rest of men, they would like to be left aside in a backwater eddy of our own wherein we might paddle our separate canoe and watch the world flow past, unconcerned so long as we are safely and selfishly out of the power of the stream. It is an ignoble attitude and an ignorant one as well, and its sole excuse lies in an ignorance which has a limited justification.

There was a time when America was sufficient unto itself. It was before the coming of Columbus. From that day forward the tendency of our expanding life has been ever toward increasing touch with all men. Before the close of our colonial infancy we had reached far out into the world, and no small part of the bitterness of the pre-Revolutionary period arose from the restraints imposed upon our external trade by the imperial policy of the mother country. The necessities of the conflict out of which the United States were born forced

us to look abroad for help, and any student of that struggle will find that four, if not five, other nations rendered friendly assistance at our birth. From France, Spain, and Holland we received financial, economic, and military aid: Prussia sent us the stern disciplinarian who trained our troops; Russia at least refused a request to furnish mercenaries to our antagonist. In our heroic struggle with that poverty and ineptitude which Washington found as serious foes as the army of the enemy, we had the moral and practical support of these established powers. It is not pertinent here to inquire into their motives; we were the beneficiaries of their acts.

In our national childhood our ships haunted every sea, and Oriental Pacific ports and the islands of the Indian Ocean were more familiar to many in our chief centers at the time than was the interior of our own land. For decades the contacts of our growing international trade led us to possess in substantial measure the international mind, and this was accentuated by the distress arising from the Embargo of 1807. These conditions prevailed until the middle of the nineteenth century, increasing with the rise and progress of modern industry.

There came upon us fratricidal strife, and in the throes of that new birth our minds were intensely

concentrated on our own desperate necessities to which all else became incidental. The crisis past and the Union saved, there fell upon our shoulders the task of developing adequately our national domain. We built a great empire in our Western States. To do it took such fiscal resources as we had and more, for we reached out to the civilized world for funds. This great work of nation-building was done at a time coincident with the collapse of our own water-borne commerce overseas. We did it well and well did other peoples aid us in doing it. The task was present, immediate, and it forced us to think for decades chiefly of ourselves and to concentrate brain and hand upon our own problems. In so doing we lost most of our popular and intimate touch with the world beyond our borders, for, with exceptions at times and places, it was at once our privilege and obligation to give our best to the development of our vast inheritance. It is not yet long since this was accomplished, since we ceased to have a domestic frontier. Inevitably, the great accomplishment had the normal consequence of making us more self-conscious and less world-conscious. The self-consciousness we still retain, the world-consciousness we have only in part regained. During the latter part of this period came the development of science in the field of industry. This led rapidly to the increase of those

demands upon the world for which our financial needs had led the way, and by the time the West was fully won and organized and our modern industries had become firmly established, we had linked ourselves with all mankind so firmly that the bonds can never be broken. The very richness of the life we have won, the very height at which our standard of living is fixed, have as their necessary corollary not only a renewed but a more intimate fellowship with all men. It has become a truth to which a great financial institution lends its authority that 'the prosperity of all countries, our own among them, is bound up with one another.' [1] In the early days of the ever-advancing American frontier, it was sufficient for the pioneer to do his whole duty by his household. As the country became settled, the obligation enlarged, and as communities grew into states both the vision and the duty correspondingly expanded. Even this growth of outlook was achieved with difficulty, and it was only through a long lapse of time that the minds of our people came to grasp fully the conception of a national life and to adjust themselves to its responsibilities. Local and State pride long resisted the intrusion of the national idea and accepted with reluctance the Constitution

[1] Cf. Mechanics and Metals National Bank, New York, circular, January, 1926.

of which we are now so justly proud. The process of assimilating another and a larger truth is now progressing, and there are those among us who do not comfortably digest the idea of America as one of an international family to which she is related, not only by blood and by historical associations, but by the intimate personal contacts of each day's living. The historian of the future may look back upon the present time as one in which a saturated nationalism is crystallizing into a world patriotism, resisted at first because it may have seemed to minimize the relative value of things near and visible, and accepted only as our mental vision expanded so that we see that the man across the ocean is our neighbor as well as the man next door.

This story of our new world-life — the renewal on a far larger and closer scale of an earlier intimacy — has not yet been told. It has burst upon the consciousness of many of us almost as a shock, and some of us resented it. Are we to believe at the very time when we have achieved greatness for ourselves, that we have also become dependent upon others? That is the controlling truth of to-day. So have science, literature, art, commerce, industry, and finance done their work. Even as we struggled on what seemed our separate upward path, we were becoming more and more intimately concerned with world affairs. To-day at the summit of our

power, the richest and economically the strongest of the nations, we are dependent in manifold ways upon others. We do not, indeed, always show in our behavior the calm consciousness of an adult strength. On the contrary, we sometimes manifest the irritability and hastiness of national boyhood. Not infrequently our international manners are bad; we are quick to use harsh speech and to ascribe to others motives such as we should resent were they by others ascribed to us. Our reëntrance upon international life has been to many and still is to some so unconscious that we have not yet acquired fully either the international mind or the habit of generous courtesy. Our self-consciousness has not yet merged into world-consciousness as it must do before America can take and hold a place of worthy leadership among the nations.

It is interesting to hear an elder statesman speaking of the nations across the Atlantic as having rivalries and antagonisms in which we have no share, for in the strictest truth there can be none such. President Wilson was right when he said in 1916:

> We are participants whether we would or not in the life of the world. The interests of all nations are ours also. We are partners with the rest. What affects mankind is inevitably our affair as well as the affair of the nations of Europe and Asia.

It may seem true that local disputes far beyond the sea are none of our concern, but such a view is partial and illusory. The world has become so closely interrelated that difficulty or disaster spreads among the nations as waves caused by a stone thrown into a pool extend to its borders.

In a scientific laboratory pure science directs research into fields which are as yet beyond our ken. To the casual observer it seems as if he had no share in that research or in any results that are likely to flow from it. The scientist knows better. He cannot say when and where the new truths he discovers will enure to the benefit of men, but with supreme faith in the value of such truth as he can find, he pushes on certain that in time his work will develop that which will benefit his fellows. It is an act of faith and all the history of recent centuries justifies that faith. So, in the laboratory of politics the reactions do not always visibly affect our lives and men say we have no share in them, but those who have the far vision of the solidarity of society know that there is no problem, no rivalry, no disaster, no achievement, which does not in some way and at some time affect us. It is futile and ignorant to-day to say in the political world that any foreign problem can be so limited that we shall not in some way feel in America the motion it creates. Shrewd old Benjamin Franklin said, 'We must all hang to-

gether or we shall all hang separately.' He said it when isolation among Americans was very popular and when hanging together was as difficult as it was novel. There was little notion of a nation then. The Colonies were a group of separatists tentatively united by a general danger and a common fear. The words 'United States' had then a different sense and a rather unwelcome sense as compared with that they now bear. It took over eighty years of time and a great war to give them their full modern meaning. Sixty years have elapsed since that meaning was established and we have had our part as a united nation in another great war, for we came at last to see that our future was involved in its outcome whether or not we wished it to be so. Are we able yet, with Franklin's clear sense of the need of unity of purpose, to project the influence of America into the world as it is to-day? Have we reached the point where economic and social truth respecting the relations of nations can be discussed calmly and with the sense on the part of the average man that these things really matter to him, that he is part of a life that is greater than that of any one nation? There are not wanting signs that we are not as sure of ourselves as some say and as many would like to think. We betray in public debates a nervousness, a fear of responsibility, not quite compatible with the assurance of strength.

We seem to speak, or to have those who speak for us, as from an inferiority complex, admitting dependence upon others, but complaining that their methods are unkind, and almost at the same hour voices are raised in the accents of a harsh creditor, ignoring the effects upon others of our demands for payment.

What is it of which America may be most justly proud? Of her great area? Siberia is larger. Of her vast population? China is more populous. Of her varied resources? They are insufficient to maintain her life to-day. Of her accumulated wealth? That is but one form of power and brings with it the responsibility of power, and the history both of men and nations shows that power may be either a curse or a blessing as it is well or ill used. Pride in wealth on the part of men is not esteemed highly by their fellows, and America as a rich creditor country faces the possibilities of loss of the esteem of men should she prove inconsiderate of them. America may be justly proud that she has brought, through the application of science and energy to production and transportation, the material wealth of the world into the home of the average man to an extent to which it has never been done before. We have gone far, farther than any one else, on the way to the conquest of poverty, but we should remember that it is the wealth of the

whole world and not merely our own wealth that we have thus put at the service of the average man. If the material life of an American family averages higher upon the whole than that of families in other lands, it is because all lands have contributed. We may be grateful for the energy and wisdom that has caused us to take the wealth of the world, add it to our own, and place it at the disposal of our people. For this is what we literally have done and are continuing more and more to do. This condition, however, carries with it the acknowledgment of service to us on the part of men in every clime and country and the obligation of service on our part to the men of every country and clime. Our national life is not only that which we alone have made it. Our resources are not those alone which we ourselves unaided have developed. Our wealth is not wholly self-made. Our power is not wholly self-created. We are, as respects our material wealth, as we are in our human population, the composite result of the toil of the world, of the thought and labor and sacrifices of men everywhere, and therefore we are akin to the world and may never assume that it has been said to us, 'Come ye out from among them and be ye separate.' Our prosperity is shared by the men and women of all the continents. We cannot prevent this if we would; we should not prevent it if we could. Their

adversity reacts hurtfully upon us and neither they nor we can prevent its doing so. This is an inexorable result of the achievements of modern science. Were it possible to detach ourselves wholly from others and become separate, we should, in doing so, fall backward. Were we to perfectly isolate ourselves, we should descend in the social scale. If we are to advance, it must be by a closer sense of unity with all men everywhere and with a candid acknowledgment of common duties, common obligations, common responsibilities.

THE END

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